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Survey and Assessment of IDRC's Completed Projects: Social Policy, Public Goods and Quality of Life Issues

Impact Study
of the IDRC-Supported Project:

Toward a Sustainable Development Strategy for the Sierra de los Tuxtlas, Mexico
(90-1012 and 92-0010)

Proyecto Sierra de Santa Marta
Xalapa, Mexico

Andrés Sánchez
Tricia Wind
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Highlights

This report is a case study for the IDRC study on the impacts of development research in the areas of social policy, public goods and quality of life issues. It explores the dynamics of research impacts as seen in the IDRC-supported project, "Toward a Sustainable Development Strategy for the Sierra de los Tuxtlas" (Centre Projects 901012 and 920010), an action research project carried out in the state of Veracruz, Mexico.

The two authors reviewed project documents, talked to IDRC and Canadian officials related to the project, and visited project sites in Mexico to conduct group and individual interviews. The impact study covers the inputs, activities, outputs, reach and micro-, meso- and macro-level impacts of the project, paying attention to the factors that influenced the project's impacts.

The project combined scientific research with participatory action research. In the first phase, the project team gathered basic data on the ecology of the Sierra, as well as on the social, economic and political factors that affect sustainable development in the region. Their interdisciplinary research formed the basis for a conservation and integrated development plan for the Sierra de los Tuxtlas region, produced at the end of Phase I. This phase also emphasized the participation of local people in development planning in the region. In Phase II, the project continued to research ecologically and socially sustainable production techniques that both protect the environment, and help to improve the livelihoods of the people in the Sierra.

Our study reveals that the project has had significant impacts within the Sierra. Its activities and outputs helped to conserve and improve soils in the Sierra, particularly through the use of green manures. The project also helped protect forest areas through reforestation, the prevention of wildfires, and the cultivation of non-timber forest products that allow for a sustainable harvest of forest resources.

A key factor that facilitated these impacts were the meso-level outputs of the project, which included the initiation of a network of peasant extension workers (*promotores*), women's groups and producer groups. These groups expanded the reach of the project's activities, supported their implementation, and ensured their more consistent up-take by people in the Sierra. Members of the groups also introduced the project's activities beyond the Sierra through workshops and exchanges.

Despite the challenges of dealing with the complexity of government programs and policies, the project has been able to influence state and federal-level policies and programs. For instance, government programs have started to fund work in non-timber forest products that the project has advocated. At the federal level, the team is now contributing to three different programs that plan for resource use and sustainable regional development in the Sierra.

The key strengths of the project are its solid research basis, its participatory action orientation, the personal reputations of team members, their ongoing strong relationships with the people in the Sierra de Santa Marta, and their ability to bring their experience in the Sierra to bear on policy dialogues with government officials.

Map

List of Acronyms and Spanish Vocabulary

abono verde	green manure; plant matter interplanted with crop to improve the soil
acahuales	fallow agricultural land
barrera viva	living barrier, hedgerows to control erosion
cacique	local or regional political boss
campesino/a	peasant farmer
campo	field
CEA	Centro de Estudios Agrarios (Centre for Agricultural Studies)
CESM	Centro de Estudios Sobre la Municipalidad (Centre on Municipal Studies)
CGIAR	Consultative Group for International Agricultural Research
CIMMYT	Centro Internacional para el Mejoramiento de Maíz y Trigo (International Centre for the Improvement of Corn and Wheat)
Comite de la Defensa de la Laguna	Lagoon Defense Committee
despensas	basic food baskets
ejido	common land owned and used by its members (usually of one community) who usually cultivate individual parts of it for subsistence and market production
fiestas	parties
GEF	Global Environmental Facility
IDRC	International Development Research Centre
INI	Instituto Nacional Indigenista (National Indigenous Institute)
INIFAP	federal agricultural research agency
mestizo	person of mixed Spanish and Indian blood
milpa	plot of land cultivated with corn
NGO	non-governmental organization
ordenamiento	resource management plan
palma	palm
palmeros	palm producers
parcela	individual plot of land
picapica	type of leguminous bean interplanted with corn to enrich soil
PRI	Partido Revolucionario Institucional (Institutional Revolutionary Party)
PRODERS	Programa de Desarrollo Regional Sustentable (Regional Sustainable Development Program)
Programa de Educación Initial	Initial Education Program; government parenting support group
promotor/a	peasant extension worker
PSSM, A.C.	Proyecto Sierra de Santa Marta, Asociación Civil
red de promotores/as	network of peasant extension workers
SARH	Secretaría de Agricultura y Recursos Hidráulicos (federal department of agriculture and water resources, now under SEMARNAP)
SEDAP	Secretaría de Desarrollo Agropecuario (state Ministry of Agriculture)
SEDESOL	Secretaría de Desarrrollo Social (Ministry of Social Development)
selva	wooded area

SEMARNAP	Secretaría del Manejo de Recursos Naturales, Agropecuarias y Pescados (federal ministry of the Environment, Natural Resources and Fisheries)
Sociedad Popoluca de Palmeros	Popoluca Society of Palm Producers
solares	house yards
UNAM	Universidad Nacional Autónoma de México
vainilleros	vanilla producer

1. Background

Over the past 25 years, IDRC has supported over 5000 research activities throughout the developing world. IDRC's Evaluation Unit is sponsoring a broad impact study in order to explore the ways in which development research contributes to national social and economic development and the factors which facilitate or impede its impact; to know better the kinds of influences IDRC is having on the development agenda and research capacity of developing countries; to use this accumulating knowledge to improve its own practice; and to inform its international partners and the Canadian public of the importance and quality of this kind of development intervention. It aims to deepen understanding of how development research, as supported by the Centre, has contributed to making a difference in people's lives and, from that, to enable the Centre to fulfil more efficiently its role as a development organization and knowledge broker.

"Towards a Sustainable Development Strategy" falls into the social policy, public goods and quality of life section of the impact study, since the project deals directly with the quality of life of indigenous peoples in the Sierra and has broad policy implications. It is one case among 20 in the section which use the experience of an IDRC-supported project to explore the range of ways impacts might be realized, for whom, and the factors which influence, positively and negatively, their realization and reach. The aim is *not* to evaluate the project itself, but rather to use its experience as a concrete basis from which to explore the nature of "research impacts" and the factors which influence them.

2. Methodology

The approach to this case study was based on the Concept Paper written by Anne Bernard and Cerstin Sander[1]. We used a method of individual and group interviews plus site visit after reviewing the files and publications of the project.

Given the short duration of field work allowed for this study, a qualitative approach was used to obtain as much information as possible on selected impacts. The steps followed consisted in:

- identifying the main project outcomes based on project reports and interviews with the research team and field workers;
- following the "stories" of these outcomes, their status today, their relevance and reach, and contextual elements that exerted an influence on them; and,
- obtaining feedback from the research team to verify observations and conclusions made.

This process involved a series of interviews with: the research team (see Appendix A2), local field workers or *promotores/as* (see Appendix A3), villagers from several communities in the Sierra de Santa Marta, and with NGO and government officials knowledgeable of the area and of the work of the research team. Our itinerary, plus a list of interviewees and other sources is presented in Appendix A1.

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[1] Anne Bernard and Cerstin Sander, 1997. *Concept Paper: Survey and Assessment of Completed Projects (94-0821/02287)*. IDRC: Unpublished internal report.

3. Project Characteristics

3.1 Purpose and strategy

In 1980, the government of Mexico made a decree that 80,000 hectares of the Sierra de los Tuxtlas would be a forest and wildlife biosphere refuge. However, very little was done to create resource use and conservation guidelines for the Sierra, and there was a lack of comprehensive information on the area. This project was designed to gather basic information on the ecology of the area and its people, including its natural, social, political and economic characteristics, in order to design a sustainable development strategy for the region. According to the project summary, and in keeping with what we were told by project researchers:

> In contrast to preservation strategies that seek to exclude or greatly restrict the utilization of living resources within particular areas, the project will promote a resource-use strategy that addresses problems of poverty and inequality while also maintaining essential ecological processes and the sustainable utilization of species and ecosystems.[2]

The project also ensured that the local population was involved in developing the alternative development strategy. Moreover, in addition to the diagnostics of the region and planning activities, the project undertook a number of practical research and promotion activities aimed at addressing the pressing practical needs of the people who live in the Sierra and important threats to the ecology of the Sierra. By the end of this first phase, the project team had begun a number of field activities, including lobbying against the set up of commercial eucalyptus plantations in the area; a fire prevention campaign prompted by extensive wildfires in 1991; and local experimentation with green manures to halt soil degradation and improve declining maize yields throughout the Sierra.

Phase II continued the participatory action research, involving applied research and field experimentation with groups of *campesinos/as*. Project activities included further experimentation and promotion on improved agricultural techniques, diversification of food production, non-timber forest products, and ecotourism. The project also emphasized creating and strengthening local community organization around production and conservation.

3.2 Objectives

According to the project summaries, the objectives of Phases I and II of the project were as follows:

Phase I (IDRC project number 901012), 1990-1992

- Generate information and analyses needed to formulate a sustainable social and economic development strategy for the Sierra; and
- Involve the population of the Sierra in the formulation of the strategy.

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[2] Project Abstract, "Towards a Sustainable Development Strategy for the Sierra de los Tuxtlas (Mexico) Phase I". 1990.

Phase II (IDRC project number 920010), 1993-1994

- Investigate, initiate and support small-scale research experiments designed to test alternative land use strategies that are compatible with the conservation of natural resources and the sustainable regeneration and exploitation of degraded areas;
- Recover and promote traditional views on the environment and customary norms of land use and forest protection;
- Explore measures needed to foster a sustainable development perspective among policy makers and agencies active in the area;
- Assess the socio-economic and environmental impact of large-scale development projects planned for the Sierra; and
- Establish a regional process for training of local villagers and grass-root experimentation in agriculture, forestry and social organization.

3.3 Actors

Phase I

This was a collaborative project between:

- Instituto de Investigaciones Sociales, Universidad Nacional Autónoma de México (UNAM)
- Carleton University, Ottawa, Canada and
- Centro de Estudios Agrarios A.C., Xalapa, México.

These three institutions created an interdisciplinary research team, directed by the anthropologists Luisa Paré (UNAM) and two Canadian Coordinators, Daniel Buckles and Jacques Chevalier (Carleton University). The team also included professionals with expertise in biology, anthropology, geography, agronomy, forestry, sociology, statistics, computer sciences, and community organization.

Phase II

A new non-governmental organization was created for the execution of this new phase. It took the name of Proyecto Sierra Santa Marta (PSSM). This non-profit organization has continued the work initiated through these two research projects. From its inception, the PSSM sought to diversify its sources of funding to accomplish its original goals in the Sierra. Its existence today, and its continuous involvement in the Sierra are both a direct outcome of Centre support, and a critical factor in maintaining and expanding the impacts of the research projects. The PSSM has not received any form of support from the Centre since the termination of the second phase in 1994.

The second phase was thus a collaborative project between:

- Proyecto Sierra Santa Marta (PSSM), Xalapa, Mexico
- Carleton University, Ottawa, Canada and

- Centro Internacional para el Mejoramiento de Maíz y Trigo (CIMMyT)[3]

The participatory nature of this second phase resulted in a more complex structure of actors and responsibilities. The project adopted a decentralized organizational structure based on the definition of different programs and sub-programs which would respond to needs identified with the communities and be compatible with the goals of the projects. The main project actors included the following:

The Coordination Committee: This committee was responsible for the approval of the research program proposals, administering the IDRC grant, providing general scientific guidance, coordinating the programs and submitting reports to the Centre. It was formed by Luisa Paré, Daniel Buckles, and Jacques Chevalier.

The Scientific Committee: This was a group of academics outside the project team who were kept abreast of the project's activities and could be called upon to advise on research issues. Julia Carabias, who subsequently became the federal Minister responsible for the Environment, was a member of this committee.

The Research Team: This is the interdisciplinary team of researchers forming the PSSM. Each member of the research team acted as a "program leader" for one or more programs, taking the responsibility of liaising with the *promotoras* and experimenters, providing technical and logistic support, guiding analyses of experiment results, and documenting progress of activities.

The Network of Promotores: This is a group of men and women from the Sierra. The *promotor/a* acted as the local counterpart of the "program leader", taking the lead in local experimentation, organization and promotion/dissemination activities related to a particular program. During the second phase of the project (and beyond its termination), this network received financial support from the Interamerican Foundation for training purposes. The group remains active today, working closely with the PSSM. It is composed of 11 members (2 women and 9 men) from different communities of the Sierra.

Experimenters and User groups: A number of programs resulted in the creation of local groups of experimenters that tried out specific technologies on their land (e.g., testing improved maize varieties), or groups of peasants in various communities or *ejidos* that adopted specific productive activities (e.g., group of *palmeros*, *Union Regional de Vainilleros*, or the women's groups of vegetable producers). A number of peasants also participated on an individual basis by taking up specific technologies (e.g., "living barriers" for erosion control, or green manures) in their *milpas* in order to serve as "demonstration plots" for other peasants to see.

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[3] CIMMyT, part of the CGIAR network, began to work in the Sierra through the efforts of Daniel Buckles who joined it as a visiting researcher. In this way, CIMMyT began its efforts in the Sierra to rebuild the eroded *milpa* soils as the basis for increasing maize yields.

Institutional Linkages

The PSSM established varying levels of information exchange and coordination of field activities with a number of NGOs and government institutions working in the area. These included:

- Programa de Desarrollo Integral de los Tuxtlas (a state government program aimed at conservation and rural development in the region)
- Instituto de Ecología, based in Xalapa
- INIFAP (federal agricultural research agency)
- Culturas Populares (federal agency involved community development)
- Instituto Nacional Indigenista [INI] (federal agency for in indigenous development)
- Forest Island Project (American NGO interested in conservation and tropical rainforest product development)
- Secretaría de Desarrollo Agropecuario (SEDAP) of the State government
- Secretaría de Desarrrollo Social (SEDESOL)
- Secretaría de Agricultura y Recursos Hidráulicos (SARH) (now under SEMARNAP, the federal ministry of the Environment, Natural Resources and Fisheries).

3.4 Inputs and Activities

Appendix A4 details some of key inputs and activities listed in the final technical report of Phase II of IDRC funding. The table also relates the inputs and activities to the outputs, reach and impact they had. Inputs to the project were financial, intellectual, technical, and physical.

Among the financial inputs, IDRC supported the project with over $670k ($277,377 in Phase I and $393,790 in Phase II). IDRC funding constituted 65% total project funding in Phase I and 45% of funding for Phase II. Other funding sources included CIMMYT, Forest Island Project, Desarrollo y Paz, Interamerican Foundation, Rockefeller Foundation, government departments, the Dutch embassy, the Autonomous University of Mexico (UNAM) and Shaman Pharmaceuticals. According to project leaders, IDRC provided "core funding" for the project, while the other actors tended to support specific activities, like an ecotourism venture in the community of Santa Marta, or experimentation into the production of a medicinal plant. Funding diversification can be considered one measure of impact since it shows that the project was able to branch out from its IDRC funding and develop relationships with other national and international organizations. Other funding was also a mechanism for further impacts, since it was mainly through this additional funding that research results were implemented after IDRC withdrew. Moreover, it expanded the project's reach since more organizations were involved with PSSM's work.

IDRC inputs also included intellectual support. Project files show that IDRC personnel visited the projecy four times, once for proposal development before the project started, twice by the program office for Phase I and once during Phase II. IDRC's library supported the project's lobby against a eucalyptus plantation planned for the Sierra by providing reference materials. IDRC also supported opportunities for project personnel to share their experiences and learn from others at international conferences. Finally, program officers provided some critique on a project report that was being prepared for publication.

Inputs from other sources included UNAM's auspices for the project from 1990 to 1993. This meant that all financing and official business came through UNAM, increasing the administrative burden on the project leader.

IDRC funding also provided for institutional links between the project at UNAM and Carleton University in Ottawa, Canada. This link included the work of Dr. Jacques Chevalier as a co-principal investigator in the project, and his input in the development and supervision of specific research activities within the project. The collaboration between the Canadian and Mexican researchers seemed to be quite good. Chevalier had worked in the Sierra throughout the 1980s, and he collaborated with Paré and Daniel Buckles (who had also been working in the Sierra for his PhD research and later with his work at CIMMYT in Mexico) to develop the project proposal. According to Chevalier, the Canadian and Mexican team members worked together with minimal tension, since the three principal researchers were "on the same wavelength".[4] This relationship between academic and research institutions also made it possible for several graduate students to carry out their field research in the Sierra.

Program-specific physical inputs will be discussed in the context of their program in Section 5. These include inputs like tree and palm seedlings from SEDAP, the state Ministry of Agriculture, for the project's work in reforestation and forest-product cultivation, and the secondment of SEDAP personnel to the fire prevention campaign in 1991.

Activities. The project included both basic research and participatory action research. The team gathered biological, topographical, climatic and other types of information on the Sierra region; information on land use patterns, agricultural techniques and the degradation of forests, soils and bodies of water; social, anthropological, economic and political information on the people (mainly indigenous Nahua and Popoluca speaking people). The interdisciplinary approach supported their very human-centred management plan, emphasizing the integration of people in the zone instead of assuming that ecological protection and human development are mutually exclusive. This puts the project at odds with other actors like SEDAP and the Instituto de Ecología whose conservation plans for the region would preclude people living in certain key areas.[5]

The basic research was complemented by action-research which not only brought members of the Sierra communities into the diagnostic and planning process, but also aimed to assist them in finding ways to improve their livelihoods through alternative production strategies. The researchers sought to have an impact on the lives of people and the health of the environment, through activities that could produce results in the shorter and longer-term. The programs included:

- improvement of staple food production
- management of forest resources and fallow lands (*acahuales*)
- management of fisheries and water resources
- municipal organization and planning

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[4] Jacques Chevalier, Carleton University, Ottawa, Ontario. September 25, 1997. Please note that all personal quotations are paraphrased from interview notes.

[5] Jésus Dorantes, Director Forestal, SEDAP, Xalapa. November 17, 1997.

- organization of producer groups, ecological committees and women's groups.

The strategies used included community diagnostics, *campesino-to-campesino* dissemination, grass-roots experimentation, recuperation of local worldviews that support sustainable development, and liaising with certain government and other non-governmental agencies for financial and technical support for their initiatives. These will be discussed in further detail in section 5.

The specific activities under each program included:
Staple Food Production:

- soil improvement through green manures (macuna, or *picapica manza*)
- soil conservation through living barriers (hedgerows) and contour planting
- seed selection and experiments with local and new varieties of corn
- diversification of food production in house yards (*solares*) and in the fields (*milpa*);

Management of Forest Resources and *Acahuales*:

- management and cultivation of palms
- vanilla cultivation
- rain forest herb tea
- development of improved variety of *Zapote Mamey* (a fruit)
- use of *Sangregado* (*Croton draco*) as medicinal plant for the pharmaceutical industry
- improved coffee production
- reforestation;

Management of Fisheries and Water Resources:

- creation of local committees to guide and oversee sustainable use of fish and water resources
- introduce food crops to cultivate in the flooded lowlands (*malanga* and water spinach)
- attempts to open the sand bar mouth of the Laguna de la Ostión
- aquaculture programs and fish nurseries
- reforestation around rivers and in the mangrove swamp of the Laguna de la Ostión;

Municipal Organization and Planning:

- planning, especially around the Laguna de la Ostión in the municipality of Pajapan
- community planning workshops in five communities;

Zoning Plan for Biosphere Reserve:

- included mapping out nucleus zone, developing a land use and management plan and outlining a social strategy for its implementation;

Other activities included:

- Lobbying for sustainable development and social equity
- Fire Prevention and Control
- Selective Logging Permits
- Ecotourism and
- Crafts.

4. Contextual Elements

This section presents only a sketch, in space and time, of the complex reality of rural Mexico. Its purpose is to provide the reader with tools to better understand the relevance of project goals and strategies, and the challenges in bringing about change. The discussion highlights various social, ecological, political, techno-scientific and cultural influences affecting the current state of the environment and living conditions of peasant populations.

4.1 The Disappearing Forests of Mexico[6]

Mexico's remaining forests amount today to about 50 million hectares, covering 25 % of the national territory. These ecosystems have suffered relentless degradation over the last five decades. The government's own estimates put the level of deforestation between 1970 and 1990 at 17 million hectares, or 30% of the forest cover that existed in 1970. Current deforestation rates are not any better; present values cited in the literature range from 700,000 to 1 million hectares per year (or 1.4-2% per year).

The forests of Mexico have two important and unique characteristics: first, they are inhabited forests, with an estimated population of 18 million people, mostly indigenous; and second, 70 to 80% of these lands are owned by approximately 8,000 communities or *ejidos*[7]. These local populations, considered to be among the poorest in the country, depend on the forests for their subsistence and income generating activities. Community attitudes, decisions, and practices have therefore a significant impact on the rate of degradation, transformation and/or preservation of these ecosystems.

In addition to commercial logging, non-timber products have always helped support the local economies, beginning with household subsistence. These include commercial (e.g. palms, pine resins, honey, wild animals, etc.) and subsistence products (e.g., medicinal plants, edible plants, animal meat, fuel wood, and construction materials). Unfortunately, official policies and programs have always ignored these essential contributions of the forest to the livelihood of forest communities.

Even though local populations inhabit and have title to most forest lands in the country, historically, they have received little benefit from their exploitation. The reason is that, in spite of land ownership, the Mexican Constitution (Art. 27) determines that forest resources are a national good. This conflict between land title and use rights led to the unequal distribution of benefits and the continued

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[6] Most of the information presented in this section was obtained from: L.K Snook, "Uso, Manejo y Conservación Forestal en México"; D.B. Bray "La Reconstrucción Permanente de la Naturaleza"; and, L. Merino Pérez, "Organización Social de la Producción Forestal Comunitaria", in *Semillas Para el Campo*, eds. L. Paré et al., UNAM, SSS Sanzekan Tinemi, and SALDEBAS, 1997.

[7] The *ejido* (or "agrarian reform community") is a form of land tenure granted by the nation to groups of peasants that solicit land through the agrarian reform laws (see section below: "A Brief History of Politics and Power in Rural Mexico") . The *ejido* can be either parcelled into individual plots to be worked individually (this is the most common case) or it may remain undivided and worked collectively.

destruction of forest ecosystems during most of this century, as forest communities were unable to exert any form of control over forest resources until the mid 1980s. From the early part of the century, and up to the mid 70s, government policies favoured on the one hand, the creation of a system of concessions to private and later state commercial firms, and on the other hand, conservation and logging bans of the remaining forest areas. Commercial concessions were granted by the federal government for periods ranging from 25 to even 40 years in some cases. The *ejidos* and forest communities were paid for each cubic metre of timber extracted, but at prices set by the government which were below the international market value. The participation of communities thus amounted to the provision of cheap labour which subsidized a very protected national forest industry.

The loss of control over the land and the absence of benefits resulted in the loss of a sense of value of forest resources in many communities. In others, it lead to resentment and an increased opposition to the concession holders, leading in some cases to an outright refusal to sell the wood. Beginning in the 60s, a new policy promoting the colonization of tropical forests came into effect, further complicating the situation. The government sought to diffuse a peasant crisis and demands for agricultural land by expanding the agricultural frontier into the less inhabited zones, away from the central region of the country. Cattle ranching was actively promoted by the government in some parts of the country as a viable agricultural alternative. Numerous *ejidos* and human settlements were formed inside concession lands and even in protected or conservation areas. Leticia Merino Pérez summarizes the situation[8]:

> Towards the late seventies, the end result of this policy was already frankly alarming: destruction and degradation of the forests; general impoverishment of peasant families; a chronic shortage of supplies for the forest industry and the increased discontent of the communities whose lands were subject to concessions.

The system of concessions thus proved unable to meet the forest industry's demand for raw materials and created social conflict. When the concession periods came to an end in the 80s, these were not renewed.

A new model for the exploitation of forest resources began to be applied in the mid 80s. This model, known as "socioproduction" focussed on the organization of communities for the extraction, sale and even processing of their timber products. A new forest law was approved in 1986, giving forest communities control over the use of forest resources and the right to administer their own "technical forest services". Communities could now develop their own extraction plans, including cutting rates, but subject to government approval. This new era also marked a generalized disinvestment and declining support from the government to forest communities. The utilization of non-timber products remained largely as unorganized individual activities, and informal (and illegal) logging continued generally unchallenged.

Communities continued to use the same inadequate practices and forest management methods that

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[8] L. Merino Pérez, "Organización Social de la Producción Forestal Comunitaria", in *Semillas Para el Campo*, eds. L. Paré et al., UNAM, SSS Sanzekan Tinemi, and SALDEBAS, 1997, p.142 (my own translation).

they inherited from the concession days[9]. Most community forest industries were unable to provide sustained employment to members of their own communities. Many others went out of business and/or are operating at a loss. Snook lists the following factors as contributing to the lack of success of these new local industries[10]: cultural values in which "efficiency" is not an overriding concern; lack of administrative capacity; decapitalization (distribution of profits among members of the community with little or no re-investment); lack of adequate technical support; and, in some cases, misappropriation of funds.

In the nineties, free trade and the new changes to Article 27 of the Constitution are again transforming the context of community forest production. The changes to Art. 27 allow the privatization of *ejido* lands that are being used for housing and/or agricultural purposes (treed areas cannot be subdivided). More research is required to assess the full effects of these changes. Their early impacts have not been encouraging. NAFTA for example, accelerated the import of cheaper wood products forcing many local forest industries out of business. This in turn has lead to rather bleak scenarios as local communities once again struggle for survival. Possible consequences include an increase in the clearing of forests for agricultural purposes as local forest industries collapse, increased migration of peasants to cities as they sell their land, and increased illegal logging by individuals. More than ever, it seems necessary to increase the value or worth of the forest and forest products in the eyes of local populations, and foster sustainable agroforestry alternatives to reduce the pressure on the remaining forests.

4.2 The Inheritance of the Green Revolution

Seventy percent of agricultural production in Mexico is carried out by indigenous peasants on sloping fields in mountainous areas[11]. The *Green Revolution* succeeded in the last two decades in disseminating a technological package of intense chemical fertilizer, pesticide, and herbicide use, "improved" corn varieties and subsidized irrigation. It also left peasants more marginalised, as it lead to the loss of agricultural diversity, abuse of agrochemicals, increased deforestation, and a severe loss of soil fertility. Nigh and Salazar (1997) judge the application of this technological package as a

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[9] Both Bray (1997) and Snook (1997) argue that the forest management method most widely used in the country is inadequate and without a sound ecological foundation. This method is called the Método Mexicano de Ordenación de Montes or MMON. Until 1986, it was basically the only method recognized by the government. It is a selective logging method which did prevent outright forest destruction but also produced serious drawbacks. According to Snook, the application of this method resulted in the extraction of the best and most valued trees. It prevented the regeneration of pines while favouring the increase of oak trees (of a much lower commercial value). The method failed to ensure a sustained yield of desired species to the forest industry. Current extractions are still aimed at a decreasing number of old trees, compromising the productivity of the forests for future decades.

[10] Snook (1997, p. 26).

[11] Cited in Bray (1997, p.13)

resounding failure[12] . The authors argue that this package (and policies for implementing it) failed to address the critical factors limiting production in most agricultural lands. Traditional agricultural practices (burning, steep sloping furrows, exposed soil) favour erosion and compaction of the soil, reducing any benefits from the application of agrochemicals and irrigation. In terms of costs, the authors summarize the situation as follows[13]:

> Conventional technology, in particular chemical fertilizers, pesticides and irrigation works, have a tendency to gradually increase the costs of production. Fertilizers maintain production over a certain period of time without needing to worry about the organic matter content in the soil or protecting against erosion, but only for a limited time, and with greater doses required year by year. Pesticides cause resistances and destroy natural enemies provoking the "necessity" to apply greater quantities of pesticides, that are more toxic and expensive. Because of deforestation, and also due to the neglect of erosion control, irrigation works tend to become laden with sediments losing efficiency and increasing in cost. Under this conventional system, costs of production tend to increase year by year, while yields and the quality of products tend to decrease as a consequence of ecological deterioration.

Perhaps the most damaging effect of the Green Revolution and government policies was the neglect of soil conservation practices. Estimates found in the literature on the extent and rate of soil degradation vary from alarming to catastrophic. Studies in the mid seventies indicated that up to 80% of national soils were experiencing severe erosion. By the early eighties, the figure had risen to 98%. Even official figures from the Secretaría de Agricultura y Recursos Hidraúlicos (SARH) in the early 1990s report that 86% of the national territory show signs of soil erosion. Yet, this has been viewed mainly as a crop yield problem, and not as a problem of degradation of the ecosystem with important implications for the future. The response has been the application of chemical fertilizers to maintain yields in the short term, while neglecting investments in soil conservation and restoration of soil fertility. A greater efficiency in maize production in the short term has been achieved at the expense of (and with a total disregard for) the long term efficiency of sustainable agricultural production.

Less talked about is the loss of product diversity of the *milpa* and the impact on the nutritional status of peasant families. Yet, this is a problem facing many indigenous communities throughout rural Mexico. Before the application of herbicides and the loss of soil fertility, the *milpa* was able to produce different fruits and vegetables that helped balance the diet of indigenous peasants, along with the gathering of edible products and hunting in the surrounding forests. Today this diversity has disappeared from both the *milpa* and the forest, and the impoverished diet is having its toll, as data from the Sierra Santa Marta will illustrate.

In summary, while the green revolution was successful in disseminating new technologies that fostered a dependence on commercial products (agrochemicals), it failed to halt erosion, avoided any efforts to re-build the soil, and resulted in the loss of diversity in local food staples.

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[12] R.B. Nigh and S. Ozuna Salazar, "Cambio Tecnológico y Cambio Político, La propuesta de la agricultura orgánica para el campo mexicano" in *Semillas Para el Campo*, eds. L. Paré et al., UNAM, SSS Sanzekan Tinemi, and SALDEBAS, 1997

[13] Ibid, p.59 (my own translation).

How is it that policies, programs and practices can go on for such a long time with such damaging effects? Why have peasant populations allowed the relentless deterioration of the ecosystems that they depend on for survival? To begin to understand these issues it is necessary to look at the political structure that has facilitated the control and implementation of the various destructive activities, and which limited for decades any possibilities to challenge their high social and environmental costs.

4.3 A Brief History of Politics and Power in Rural Mexico

Human settlements in Mexico are divided in two extremes: a highly concentrated urban population and a widely dispersed rural population. While 20-25% of the country's inhabitants live in México City, the rural population is dispersed into tens of thousands of small rural villages and towns. In 1978, a rural population of 23 million lived in 95,356 different settlements.[14] This rural population is made up of *mestizos*[15] and mostly Meso American native groups. Estimates of the indigenous population vary from 15 to 30 percent of the country's total, depending on the definition employed. The vast majority of indigenous people are peasants. About a quarter of them (mostly women) were estimated to be monolingual in 1980. That is, they spoke only their native language and very little or no Spanish. That year, a total of 70 different indigenous languages were still spoken in the country.

This dispersed and culturally diverse rural population, and the difficult access and communications between the tens of thousands of rural communities, facilitated the development of a system of political rule based on a strong central authority and a network of regional "bosses" or *caciques* that extended their political and economic control down to the rural municipal and local governments.

Land tenure and control over its resources played a major role in the state-building process. With the Constitution of 1917 and the agrarian reform that followed, villages were no longer able to reclaim land on the basis of customary rights. Article 27 of the new Constitution made land the property of the nation, to be regulated by the state in accordance with the public interest. Peasants now had to petition the state for a piece of land. The state used this control over access to land to expand its own power and base of support in the country. The agrarian reform thus served as a fundamental element in the constitution and consolidation of the post-revolutionary state[16]. Political power was firmly centralized in the presidency and its authority over the land and its resources gave

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[14] SAHOP, 1978.

[15] *Mestizo* refers to people of mixed blood, predominantly a mingling of Meso American Indian and Spanish.

[16] Paré, Luisa (1990: 80) "The Challenges of Rural Democratization in Mexico". *The Journal of Development Studies*. Vol. 26, No 4. London: Frank Cass & Co. Ltd. (pp. 79-96).

it the flexibility to develop a system of "clientelism"[17] which ensured the hegemony of the ruling party for over six decades. This system is based on a number of confederations that organize and control civil society. In rural México, the Confederación Nacional de Campesinos (CNC or National Peasant Confederation) served this purpose. It was established in 1938 as a sector of the new Party of the Mexican Revolution (PRM) which later reconstituted as the PRI (Institutional Revolutionary Party). The CNC successfully limited social conflict in the countryside until the 1970s. Access to credit, for example, was conditioned to the affiliation with either the CNC or with another corporate group affiliated to the ruling party. By using the allocation of land, credit and social services as a mechanism to maintain clientelist and paternalistic relations with rural communities, the peasant movement was largely demobilized and depoliticized. For many decades, the official peasant organizations never opposed the state's overall policy in the countryside, nor did they articulate any alternative political or economic strategies[18] .

This control on rural México was consolidated through the regional *caciques* - political intermediaries who monopolized the distribution of public resources in the countryside[19]. These individuals can be characterized as mediators between the community and the national power structure. *Caciques* are able to manipulate political processes in accordance with their own interests. They have been able on occasions to rely even on the support of military (and para-military) forces in order to impose their dominance against any form of opposition. They often control agricultural inputs (including the distribution of credits), as well as the transport and commercialization of agricultural products[20]. Until recently, *caciques* were able to dominated local politics, controlling access to public office and guaranteeing the supremacy of the ruling party.

The resulting power structure thus bred inefficiency and corruption into an important portion of the bureaucracy and private sector. Priority was always given to ensuring the continuity of power through any means necessary, even if it meant compromising the well-being of large sections of the population for generations to come. Yet, as the agricultural sector stagnated in the mid 1970s, this clientelist system of control began to erode. A number of independent peasant organizations began to multiply and coordinate their activities at the national level, breaking the monopoly of the official

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[17] "Clientelism" can be described as the structuring of political power through networks of informal relations that link individuals of unequal power in relationships of exchange. In clientelistic structures, power and authority are vested in the top individual (president, *cacique* or head of a community) who personally decides how to distribute resources and subordinate political authority according to personal preferences. See Brachet-Márquez, Viviane (1992) "Explaining Sociopolitical Change in Latin America: The Case of Mexico". *Latin American Research Review*. Vol.27, No 3. University of New Mexico. (pp. 91-122).

[18] See Paré (1990: 81)

[19] As Paré (1990: 82) explains, the distribution of public goods and services is conditioned upon the relationships of personal and political loyalty to the *cacique*. It is a system of interpersonal and patronage relationships. Rural *caciques* come from many places: some have been local leaders in the agrarian reform process, others were members of the old pre-revolutionary rural bourgeoisie, revolutionary military leaders and their descendants, or members of the new commercial bourgeoisie.

[20] See Nigh and Ozuna Salazar (1997: 62-63)

organizations as the only legitimate vehicles for the representation of peasant interests. These independent peasant organizations and advisors (often scientists and non-governmental organizations) have evolved over the last two decades in their knowledge, their thinking, and approaches, increasingly emphasizing the absolute necessity to address the reconstruction of the natural resource base in order to alleviate rural poverty[21].

Today, two democratization projects are presently in competition in rural México: a grass-roots movement from below and the state's project from above. The state's project is primarily concerned with "recovering lost legitimacy and buffering the militancy of the opposition, eventually displacing inefficient sectors in favour of more 'modern' organizations, capable of increasing production"[22]. This official project is riddled with contradictions, as the ruling party is very much dependent on the entrenched, anti-democratic faction (*caciques*) that delivers the vote and organizes the electoral fraud in the countryside. Yet, the neo-liberal policies of the present administration subordinate the Mexican economy to multinational firms, making the state feel compelled to challenge the *caciques* in its drive to improve "efficiency" in production. In doing so, it opens more spaces for civil society to organize and demand better governance. A key demand of independent peasant organizations, one which is seen as a necessary condition for development, is the establishment of a true municipal democracy. The last six years have seen real advances towards this end, bringing with them real opportunities for change.

4.4 The Sierra Santa Marta

The Sierra de Santa Marta is part of the Sierra de los Tuxtlas in the Southern State of Veracruz. Today, about 30,000 ha of forest cover (forest and *selva*) remain in los Tuxtlas, albeit some areas have become fragmented into discontinuous forest islands. Most of these forests and selvas (about 26,000 ha) are located in the Sierra Santa Marta. The zone is of great ecological and hydrological importance. It is the only high mountain range rising directly from the East shore of the Atlantic, in either North or South America. This topography creates very unique conditions. Only three decades ago, a continuous rainforest existed linking the mountain peaks all the way down to the ocean. This direct selva-seashore connection is of extreme ecological importance even in its degraded form and should be preserved and rebuilt[23]. The Sierra's unique location and altitudinal profile, ranging from sea level to 1,750 metres above, gives the region a wide variety of climates and ecosystems which sustain an impressive diversity of life forms. Over 1,300 plant species have been registered in the region, out of an estimated total of 2,000 species. More than 400 bird species inhabit the area (about 40% of the total species of the country), along with an estimated 1,015 animal species, 157 of which

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[21] For a more detailed discussion on independent rural organizations see Bray (1997).

[22] Quote from Paré (1990:92)

[23] Ianto Evans, "Trip Report, Forest Island Project, Sierra de los Tuxtlas, Veracruz, Mexico, December 4-12, 1992"

are currently endangered[24].

In addition to its important biodiversity, the area is also critical to the water resources of the region. It feeds lake Catemaco and the *lagunas* de Sontecomapan and Ostión. It also supplies about 80% of the water to the urban and petrochemical corridor of Coatzacoalcos, Minatitlán, Jáltipan and Acayucan, making the protection of this water supply a key element for regional development[25]. Finally, the Sierra is also home to about 60,000 dwellers who depend on it for their livelihood.

This Sierra shares many of the contextual factors described in the preceding sections that favoured the continual degradation of the environment and natural resource base of indigenous communities that inhabit it. For example, the rate of deforestation of the area exceeded even the national average. Between 1967 and 1991, a total of 59,000 ha of forest disappeared from an original forest cover of 96,640 ha. This represents a loss of 61% of forest cover in about 24 years[26].

The Mexican government declared in the early 1980's the Sierra de Santa Marta as a *Zona de Protección Forestal y Refugio de la Fauna Silvestre* (Forest and Wildlife Protected Zone). In 1988 it was reclassified as a *Reserva Especial de la Biosfera* (Special Biosphere Reserve) by the Ministry of the Environment. Neither decree, however, was accompanied by a management plan to guide productive activities in the protected zone, nor even by the provision of basic information to explain the significance of the pronouncements to local communities. As a result, many dwellers in 1980 believed that the government was about to expropriate all forested areas of the Sierra, resulting in increased forest clearing by many, or attempts by the more organized *ejidos* to block the decree in the courts[27]. Deforestation rates have decreased over the last decade, but this had to do more with the steep slopes and more difficult access of the remaining forests than with the implementation of any conservation measures, except perhaps for the fire prevention campaign carried out by the PSSM as will be discussed in later sections.

Just as with most forests of the country, the Sierra is a populated area. In the period between 1980 to 1995, its population increased from 29,000 to 58,000 inhabitants. The average growth rate from 1990 to 1995 was estimated as 5.3%, more than twice the rate for the country. The population density has thus increased dramatically, from an average of 21.5 persons/km^2 in 1980, to 42.5 persons/km^2 in 1995. Eighty percent of the population is indigenous, of Nahua and Zoque-Popoluca

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[24] Source: "Desarrollo Sustentable y Conservación de la Biodiversidad: un estudio de caso en la Sierra de Santa Marta, Veracruz, Mexico", PSSM, GEF, CIMMYT, Resultados Preliminares - Resumen, Julio 1996, pp. 2-3 to 2-6.

[25] Source: Gobierno del estado de Veracruz (1992), "Los Tuxtlas: plan para su conservación y Desarrollo integral". Programa de Desarrollo Integral de los Tuxtlas. Universidad Veracruzana, Jalapa, México; cited in J.L. Blanco Rosas (1997), "El Proyecto Santa Marta - Experimentación participativa para el uso adecuado de recursos genéticos maiceros", Red de Gestión de Recursos Naturales, Fundación Rockefeller, México.

[26] Source: "Desarrollo Sustentable y Conservación de la Biodiversidad: un estudio de caso en la Sierra de Santa Marta, Veracruz, Mexico", PSSM, GEF, CIMMYT, Resultados Preliminares - Resumen, Julio 1996, p. 2-5.

[27] Ibid, p. 3-2.

origins, and the rest are of different *mestizo* backgrounds. The indigenous communities are located primarily in the southern part of the Sierra: the Nahuas in the South-East, in the municipalities of Pajapan, Mecayapan and Tatahuicapan; and the Popolucas in the South-West, mainly in the municipality of Soteapan. *Mestizo* populations arrived initially to the area of Catemaco (to the North and West of the Sierra), and from there, they have expanded towards Soteapan and Mecayapan[28] (see map at the beginning of the report). These *meztiso* populations arrived earlier in the century, bringing with them their traditions of cattle ranching and private land ownership. The growth rate for this sector of the population is closer to the country's average. The indigenous population in the South, on the other hand, has a much higher annual growth rate (5 to 8%) and is of a strong agricultural tradition (slash and burn cultivation of corn)[29].

The clearing of the bulk of the forest and selvas in the Sierra was mainly the result of the expansion of cattle ranching, as opposed to a high demand for forest products. A large part of the trees that were cut were burnt because of the difficult access to the area. Logging bans led to the illegal extraction of the most valuable species. Cattle ranching increased at the expense of the forest and began to compete with maize cultivation by reducing the areas of regrowth (agricultural resting lands or *acahuales*). The expansion of cattle ranching was actively promoted by the government in two waves of colonization (in the 1950s by the Departamento de Asuntos Agrarios, and in the 1970s by the Secretaría de Reforma Agraria). *Mestizos* from surrounding areas took over the selvas and forests that traditionally belonged to the indigenous populations of the Sierra[30].

From an ecological perspective, the destruction of forests and selvas for grazing purposes created particularly destructive problems, as Ianto Evans explains[31]:

> The selva of Los Tuxtlas is disappearing very fast. Main problems are fire and grazing, which are both destroying primary forest and preventing recolonization. The process of forest clearing for maize is structurally quite different from grazing in that maize cultivation by slash and burn leaves holes in a fabric of still-continuous forest, while grazing leaves forest islands in a matrix of grassland. Grazing favours conditions which lead to catastrophic forest fires and prevents forest regeneration. Grazing also destroys continuity of forest cover in a way that centuries of slash and burn have never done.

In addition to the relentless destruction of their natural habitat, the fragmentation or loss of continuity of the forest cover has a more pronounced effect on the survival of wildlife, as it prevents the seasonal migration from high to low altitudes of many species, and the feeding movements of large mammals. Grazing also creates ideal incendiary conditions, as cattle avoid the coarser perennial grasses, favouring the build-up of a mat of dead grass in the high pastures against the edge of the selva or

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[28] Ibid, p. 3-3.

[29] Ibid, pp.4-7 to 4-9.

[30] Ibid, pp.3-38 to 3-42.

[31] Ianto Evans, "Trip Report, Forest Island Project, Sierra de los Tuxtlas, Veracruz, Mexico, December 4-12, 1992"

forest. Ranchers deliberately burn these grasses to improve grazing. These grasses may also burn accidentally as peasants burn their *milpa* or *acahuales* before the planting of maize. Most wildfires in the selva spread uphill from these burns.[32]

From a social and economic perspective, a number of factors have combined to threaten the future livelihood of the indigenous communities. As described earlier, the green revolution extended its ravaging effects into the *milpas* of the Sierra. But there are also compounding factors: the impoverishment of the soil is exacerbated by the shortage of resting lands (*acahuales*) as the indigenous agricultural population grows rapidly, and the available land becomes more and more scarce. An immediate impact has been lower crop yields at higher costs of production. For example, average maize yields of 3 tons/ha reported in the seventies had decreased to 1.4 tons/ha by the mid 80s. The diversity of food staples also collapsed over this same time period. While in 1976, 93% of peasants cultivated beans for self consumption in Peña Hermosa, Municipio de Pajapan, ten years later only 8.4% were growing this plant. The same trend occurred for many other products of the *milpa*: for squash the decrease went from 68% to 3%; for yucca, 71% to 2%; for *chayote*, 46% to 1.4%; and for banana, 93% to 1.5%[33]. In many parts of the Sierra, maize yields have continued to decline to below 1 ton/ha.

With the disappearance of the forest also disappeared many edible plants and animals that complemented the diet and/or income of peasants. We referred earlier to the impact of this diversity loss on the nutritional status of the population. Compounding factors in indigenous communities are: poor sanitary conditions which result in high incidence of parasitic infections; and the young age of mothers who become pregnant by the age of 12 or 13, and have two or three children before the age of 17. It is not rare to find young mothers with poor diets, breastfeeding children, and with both mother and child having stomach worm infections. In the Popoluca community of Amamaloya for example, 60% of children under the age of five show signs of malnutrition[34]. Other anthropometric measurements (weight and size for age) in the communities of Soteapan and Ocotal Chico in 1994 corroborate the existence of a severe nutritional problem in the Sierra[35].

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[32] Ibid.

[33] "Desarrollo Sustentable y Conservación de la Biodiversidad: un estudio de caso en la Sierra de Santa Marta, Veracruz, Mexico", PSSM, GEF, CIMMYT, Resultados Preliminares - Resumen, Julio 1996, p. 3-40.

[34] Interview with Chano, *promotor* for PSSM in Amamaloya, November 9, 1997.

[35] Anthropometric measurements indicated that over 90% of children presented signs of malnutrition, with about 60% of them showing acute signs (below 70% in weight and below 85% in size of the respective averages for the State). The measurements were carried out on children brought in by the mothers on a voluntary basis (96 children in Ocotal and 125 in Soteapan). No averages for the communities can be inferred from these numbers, since probably mothers that were concerned about the nutritional status of their children where those who brought them to be weighed and measured. Nonetheless, the results obtained do indicate a nutritional status well below the average for the State of Veracruz. Source: Juana Sandoval, "E*l Estado Nutricional en Ocotal Chico y Soteapan. Sierra de los Tuxtla, Proyecto Santa Marta*", unpublished report, april 1994. [Andrés Sanchez helped to run this study.]

Our review on rural Mexico and the Sierra shows the similarities in the destructive environmental processes that have occurred country-wide. The PSSM's work is also not unique, but a reflection of the historical changes taking place in the political complex of the country. This organization forms part of a movement from civil society that demands a more just and accountable governance, providing coherent alternatives to the reckless approaches of present and past administrations. In this sense, the contributions of both research projects take a national significance, as this social movement draws its strength from the multiplicity of similar efforts in all parts of the country.

5. Outcomes and Impacts

In this case study, outcomes are defined as the combination of outputs, reach and impacts. Thus, in this section, we will discuss the outputs of the various activities of the project, who was reached by those outputs, and what impacts they had. We will also discuss the different factors that influenced the reach and impacts of the outputs.

As seen in section 3.4, the project's activities in the Sierra are many and varied. Given the short duration of our field trip, we decided to focus our interviews and data collection on specific PSSM programs that we judged representative of their work and accomplishments in the Sierra. Other activities involving, for example, erosion control ("*barreras vivas*" or hedgerows), fisheries, the opening of the Laguna del Ostión, coffee, *sangregado*, etc. are not discussed here, not for lack of importance but for lack of time.

Our discussion is divided into three sections: micro, meso and macro-level outputs.

- **Micro-level** outputs are those related to local initiatives to protect the environment and improve the quality of life of the people of the Sierra.
- On the **meso-level**, we will examine changes in types and intensity of community organization, including the creation of a network [*red*] of *Promotores Campesinos* (peasant extension workers), and the birth of the PSSM as a registered NGO and its emerging position as an institutional actor in the development of the Sierra.
- Finally, on the **macro-level**, we will address policy outputs, and the project's impacts on state and national government policies and programs.

We use these micro, meso and macro divisions to organize our data, but we realize that impacts are not necessarily so neatly circumscribed. Micro-level outputs from on-the-ground activities inform policy recommendations; meso-level outputs can have significant implications at the local level, as well as being an input to macro-level change, etc.

One of the difficulties in embarking on this discussion of outcomes and impacts is that IDRC funding ended at a critical juncture in the work of the PSSM. Many of the impacts we observed would probably not have been as significant or long-lasting had the organization not continued its work on local experimentation, organization and promotion. This seems especially true for the policy-level impacts which the PSSM has been able to realize in recent years. The project's policy and regional conservation planning work began under IDRC-funding, but had significant impacts only after subsequent projects with other donors helped the organization develop stronger relationships with government agencies. Our analysis suggests that IDRC funding helped to begin processes;

strengthened the organization; sponsored base-line research for use in further phases; and set the groundwork for further research, modes of operation and relationship-building of the institution.

Another challenge in assessing the extent of the project's impacts arises because there are other organizations in the Sierra that share some of the objectives and even strategies of the PSSM. At times, it was difficult to assess whether certain impacts stemmed purely from PSSM's work, or whether the project added another voice to a number of voices suggesting more sustainable cultivation practices, alternative productive strategies or modes of community organization. While perhaps posing a difficulty for impact assessment, this is actually a real strength of the project. The PSSM sought to recover and influence, rather than ignore or reject, traditional practices and on-going activities that could contribute to achieving the PSSM goals. Moreover, their contribution often consisted of bringing the scientific rigour of research into on-going local efforts, while also fostering more inclusive forms of participation and local experimentation.

5.1 Micro-level: Pursuing Conservation and Sustainable Development among People in the Sierra

The most tangible impacts of the project are on the micro-level. Based on both conventional and participatory research, the project developed several outputs that helped improve farm production, and increase the income of the people who live in the Sierra.

For the micro-level outputs, first level of the project's reach is to the network of *promotoras*. The *promotores* are *campesinos* themselves, some being community leaders, others having past training through other organizations, or people who were interested in environment, experiments and/or PSSM's approach. When the *promotoras* adopt the techniques mentioned above, they improve their own production, diversify their own diets, and they also benefit individually from training and from financial and material support for their experiments. They are also paid a modest monthly salary through the project. We will describe the network of *promotores* in more detail in section 5.2.

In the project's *campesino-a-campesino* extension method, reach ripples out from the network of *promotores* to other *campesinos*. The *promotoras* are thus both a group of "reached" people and a mechanism for further dissemination, playing an interpretive and intermediary role between the project and other *campesinos*. They invite their neighbours to see their land, which serve as demonstration plots for new techniques and crops. Several interviewees mentioned that they had gone to see a *promotor's* plot. Other mechanisms for expanding reach included workshops, videos and radio broadcasts that the project coordinates on a variety of topics, as well as promoting ideas and activities in *ejido* or community assemblies, and displays set up during village *fiestas*.

We will discuss the project's work in soil conservation and improvement, diversification of crop production, reforestation and the prevention or control of forest fires, and non-timber forest products.

Soil Conservation and Improvement

A central output in this program was the identification of an appropriate **green manure** (a leguminous bean plant) that can be interplanted with corn which fixes nitrogen in the soil, prevents erosion due to wind and water, provides organic matter to the soil as compost, and whose bean can even be used as a coffee substitute (called nescafé) and fodder for pigs. The project is well-known throughout the region for "el famoso *picapica*"[36], which is the local name for the bean plant. Everyone with whom we spoke in the communities knew of *picapica*, though not all used it in their own *parcela* (cultivation plot).

Factors affecting the impact of the green manure program:

positive:

- demonstrated effect of the output to increase yield, reduce erosion, and improve soil fertility
- effective dissemination: workshop followed-up personally by project staff and *promotores*
- start-up credit and seeds provided
- positive spinoffs: nescafé and pig fodder
- contextual factors make product more attractive/necessary

negative:

- perceived risk of mice and snakes
- more work
- government subsidizes chemical inputs

Benefits of Picapica. The *promotoras* offer first hand proof of the benefits of interplanting *picapica* to improve yields and soil fertility. In the words of one *promotor*:

> I plant less, and harvest more. Before I sowed 3-4 hectares and still had to buy corn. Now I plant 1.5-2 hectares, and I'm selling the extra. I produce more and disturb the earth less.[37]

The *picapica* is less expensive than chemical fertilizers, feeds the earth, and improves production. Moreover, the innovation has visible results in a short time. Mere, a *promotora* in Soteapan interplanted *picapica* on her new parcela this past year. Even in this short time, there was a noticeably darker colour, and higher organic content and moisture level in the soil with *picapica* cover than in soil without it (see photo in Annex). Some people have decided not to use any fertilizer on their fields, since the *picapica* increases soil fertility,[38] while others still use chemical fertilizer, though less than before.[39]

The experimentation with green manures continues. One person said that over the past season he had experimented with interplanting a different type of edible bean in his corn plot.[40] The *promotores* are working on finding different leguminous plants that can be interplanted during the dry season, since *picapica* only works during the wet season.

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36 Juanita, *promotora* for Culturas Populares in communities of Soteapan, November 11, 1997.

37 Aaron Soto, *promotor* in El Pescador. November 9, 1997. English translation of Spanish quotes are our own.

38 Suzana Aquino, El Pescador, November 10, 1997.

39 Pedro's son, Ocotal Chico, November 13, 1997.

40 Pedro's son, Ocotal Chico, November 13, 1997.

Facilitating Factors. Several factors seem to facilitate the uptake of this innovation. One is the visible, demonstrable proof of its effectiveness to improve the organic and moisture content of the soil. Another is the increased maize yields obtained by the *promotoras* themselves in their demonstrative *parcelas*. This strategy has proved effective in demonstrating to people the potential benefits of the technology. The innovation was disseminated through other methods as well, including workshops by PSSM personnel, video presentations, technical advice and personal follow-up, and even a demonstration plot for children through a school in Pajapan. The project provided free inputs of seeds to get people started. Another factor is the team's approach to encourage *campesinos* to experiment on their own with the innovation and at their own pace, avoiding a hard sell or a stern anti-agrochemical position.

Perceived Obstacles. Despite seemingly clear indications that this innovation works, some people have decided not to use it. Two informants suggested that the increased plant matter will attract mice and snakes to the *milpa*; a CIMMYT study showed that after the first year of trying the interplanting, farmers considered this the most important disadvantage of using *picapica*.[41] However, none of the *campesinos* using *picapica* that we interviewed have actually found more snakes in their own fields. One *campesino* did complain about more mice. One person had had a bad experience with the *picapica* growing so high that it interfered with his corn and his yields suffered. However, his explanation showed that he had sowed the *picapica* and corn simultaneously, even though the project and the *promotores* emphasize that you should wait 30-40 days after planting the corn,[42] in order to avoid such competition between the plants.

Another perceived obstacle is the higher investment in work needed initially to adopt this innovation. The CIMMYT study reported that the traditional way of cultivating corn with both burning the land and using chemical inputs required 65 days of work per hectare. Using green manures interplanted with maize required 79 days of work in the first year, decreasing to 74 days in the second. The study also suggested that this number would probably continue to decrease as *campesinos* became more experienced in managing the *picapica*.[43] The numbers of working days per hectare estimated in this study do not, however, take into consideration the potential difference in yields between methods. As in the case of the *promotor* Aaron, better yields with *picapica* can reduce the overall number of hectares needed to be cultivated, and result in fact in a net decrease in the *campesino's* workload.

Contextual Factors. According to the CIMMYT study, recent economic changes may make *picapica* interplanting more attractive to farmers. Since the green manures were first introduced in 1992, corn prices have gone down, while the prices of chemical inputs are higher and there is less agricultural credit available. These factors are felt especially by the poorest farmers. Indeed, the study showed that those farmers who benefit the most from using *picapica* were those who did not normally use herbicides or fertilizers on their plots, these generally being the poorest of the farmers

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[41] Soule, Meredith J. 1997. *Evaluación campesina del frijol de abono empleado como abono verde en Veracruz, México: Experimentación y beneficios esperados.* México: CIMMYT, p.8.

[42] ibid. p.6.

[43] ibid. p.7.

who could not afford them.[44]

Another reason for the likely increase in adoption of this technology is the continued impoverishment of agricultural soils. The increasing shortage of *acahual* land is forcing people to continually plant in tired lands instead of rotating cultivation to allow the soil to regenerate naturally. It is becoming essential for farmers to re-build their soils in order to sustain production.[45]

Current Reach. Reach has expanded gradually in the case of the green manures. While travelling through the Sierra, we saw many fields that had *picapica*. Individual *campesinos* may decide to plant it in only certain sections of their *parcela*. For example, when we visited Mere's plot, she pointed out that only one of her neighbours had tried *picapica*. He had begun to interplant the *picapica* at the top of his hillside parcela (in order to stop erosion from the top). The following season, a greater area of his field was covered, with extra seed that he had saved from his initial harvest.[46] In other *parcelas*, we noted that not *picapica*, but other green matter grew amid the corn stalks; this suggests that herbicides were not recently used in those *milpas* and the plants are probably being used as *basura* (organic compost), something which the project also promotes. We weren't able to talk to any of the farmers with these *milpas*.

PSSM's reports do not fully documented the expansion of the reach and impacts of *picapica*. The final report of Phase II of IDRC funding indicates that in 1993, 2250 people had attended workshops and talks on green manures. This led to 700 farmers in 16 communities being directly involved with PSSM in using *picapica* in their plots. The researchers found that of the farmers who had *promotoras* visit them after they received seeds for *picapica*, 92% adopted the technology. Of those farmers who only received seeds, 55% adopted it. Note that this means some people were "reached" twice, and the second time would have been with more intensity than the first, since it was one-on-one support. There have been no recent surveys in the Sierra on the number of people using green manures. Based on our interviews, we can only conclude that most *campesinos* know about it, that it is used by many, and, given the context, its use will likely increase in the future.

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[44] ibid. p.18, 19.

[45] Faustino Martino Vargas, Consejo de Vigilancia del Ejido, Pajapan. November 11, 1997.

[46] Because November is harvest time, we could easily see the contrasting bushy green of the *picapica* amid dry, brown, doubled-over corn stalks.

Diversification of Crop Production

Section 4.4 outlined the serious decline in the varieties of food harvested in the Sierra. The project's focus on diversifying food production aims both to improve people's nutrition, and improve their food self-sufficiency instead of relying on monocrop production of corn or commodities like coffee (whose prices vary drastically). Two main sites of intervention are the *milpa* and the *solar*, which have become increasingly separate spheres of activity for men and women in recent decades.

Factors affecting impacts of diversification
positive:
- tangible output: more food
- follow-up provided both by team & through groups
- seeds, training and other inputs provided/accessible
- demonstrated success through *promotores*

negative:
- more work, can't use herbicides
- negative past experience with other programs

Milpa

In corn production, the project had people experiment with native and improved varieties of corn, and facilitated workshops on seed selection. This work began under IDRC financing, and continues today. In 1996-97, 15 workshops in field corn selection reached 200 families in 12 communities. The project encourages testing different varieties of corn, including improved varieties from CIMMYT and native varieties. One native variety currently encouraged is very short (the 4-ft high stalk still carries regular sized cobs), which makes it less susceptible to damage from the Sierra's strong winds.

Within the *milpa*, the *picapica* is one way of diversifying *milpa* production (since the beans are edible for humans and the plant provides pig fodder as well). The project also promoted interplanting different fruits and vegetables in with the corn, including banana trees, squash, pineapple, yucca, beans, guanabanana, camote (white, yellow and red), and tomatillo.

Factors. Key factors that hinder the diversification of the *milpa* include the use of chemical herbicides, impoverished soils, as well as the cultural loss of a diversified production tradition. Crop-specific herbicides have allowed people to maintain a staple corn production in degraded soils, albeit declining yields, and at the expense of killing off other food plants grown in the *milpa*. Referring to the diversity of foods grown in the *milpa*, one *promotor* described this process as follows:

> It was lost when the technicians arrived to kill with chemical products. For example, *quelite* [was lost]. From there came the malnutrition of families, the impoverishment of the *milpa* ... *Campesinos* became too trustful because chemicals are faster to clean with [weed out the *milpa*]. Before, one would take 15 days to do it, but with chemicals, in two days it's done. The Green Revolution - the agro-technical packages - I say it's like drugs: you give it away [very cheap] until you create dependence, and then they raise it! [the cost] From $10 it goes up to $70-80. It did not solve the problem! It became more acute! Natural seeds disappear, and then you need to buy seeds, you need to buy chemicals and it [the milpa] does not produce![47]

[47] Aaron Landa Soto, *promotor* in El Pescador, at *Promotores* meeting, November 9, 1997.

Diversifying the *milpa* is not a simple endeavour. It requires not only reducing herbicide use, but also a renewed mind-set and approach to diversified cultivation "without drugs". Obstacles include the perceived time savings of herbicide use, and government programs that favour monocrop production and neglect soil conservation. Within PSSM's approach, diversifying crop production is closely tied to soil productivity and the green manure program. Interplanting green manures also allows for this diversification of staple foods, without excessive labour costs. The declining crop yields occurring with the agrochemical-based models are likely to encourage the dissemination of the more sustainable organic alternative in the future.

Solares

We talked to eleven people (nine women, two men) who are involved in PSSM's kitchen garden, or *solares*, program. While the idea of growing food in one's yard was not new, we noted that a large number of households do not have gardens. In the community of Ocotal Chico there were a significant number of houses whose front yards were neatly swept, but with nothing growing in the red earth.

The project focussed on teaching women how to prepare the beds, supplying them with seeds, and providing instruction on how to prepare new vegetable varieties. Current activities also include experiments to improve small livestock rearing, including pigs and chickens. In the lower region of Pajapan, women were growing a variety of vegetables, including water spinach that PSSM had promoted. In El Pescador, women involved in the project had built pig pens to ensure that their pigs would not eat their neighbour's plants. This was still a problem in other communities.

The types of plants grown included: carrots, cabbage, tomato, beans, carrots, tamarind, yucca, sugar cane, corn, coffee, peppers, cilantro, flowers, chayote, radishes, beets, lettuce, ejote, silka, cauliflower, aselga, rabano, vetabel, and fruit trees, including oranges, lemons, and mango. Two women had planted *picapica* in their yard, both to improve the soil and to provide pig fodder. The vegetables were primarily for household consumption, displacing the need to buy vegetables throughout the year, and the women also sold their extras for cash.

Factors. Not many women we spoke to were in the process of growing vegetables in their garden plots. The rainy season had just finished. Heavy rains in this part of the Sierra prevent the growing of vegetables during most of this season. A couple of women had not grown anything in the past season either because of illness or injury, but said they were planning to prepare their beds in the coming months. In the community of San Fernando, there was also the problem of a project proposal being rejected by a government institution. The 72-member women's group there requested seeds, garden tools and fencing materials from the government. The rejection of this proposal has left many members of the group discouraged.

Another obstacle in the eyes of the PSSM is the competing government programs. The PSSM is not the only organization promoting vegetable gardens in the Sierra. The federal social service agency, DIF (Integral Development for the Family), also gives out vegetable seeds through local health clinics, as a program to combat malnutrition. The situation can be summed up by the following excerpt from a progress report to the InterAmerican Foundation:

> Some institutions like the DIF or the Initial Education Program have consulted these *promotoras* in order to improve the delivery of their own programs. Not much progress has been possible, because our strategy implies that women must buy [their own] seeds and paternalism has made many people to want everything to be given to them. Also competition of other institutions that intervene with clientelistic attitudes creates mistrust and divisions that must then be overcome.[48]

A typical approach of the DIF in this area is to use the donation of seeds or other food staples such as *despensas* (basic food baskets) as patronage tools for the ruling party. Timing is linked whenever possible to municipal, state or federal elections, and the emphasis is to deliver the inputs (free goodies) in the name of the party. In order to get people to accept the vegetables seeds, their distribution has been tied to the distribution of free corn flour during maize shortages.

Beyond the often problematic political overtones of DIF's *despensas* in the Sierra, another problem with their programs seem to be their lack of attention to ensuring the seeds are used. A number of informants stated that government programs tend to dump inputs into communities, and rarely give the necessary follow-up advice to ensure that the initiative works. A key reason why PSSM's gardening initiatives seem to work better is precisely this aspect of *follow-up support*. Members of the promoters' network and PSSM's personnel provide concrete follow-up and support to ensure initiatives are implemented. In some cases, women were growing vegetables that they had never eaten before, so this follow-up could give advice on both how to cultivate the plant, and how to eat the fruit.[49]

Another aspect of ensuring follow-up arises from the project's emphasis to start producer groups. The women's groups provide spaces in which women share and receive training for their gardens and livestock. In Ocotal Chico, a small impact of the group is that women from the group helped to plant and maintain the garden of another member when the latter was unable to do it all while she was pregnant. The women's group in San Fernando submitted a joint proposal to INI to get seeds and implements for their gardens. We will discuss the impacts of these groups in section 5.2, but they are also relevant here as another factor that supported the positive impacts of the gardening work for households' food consumption.

Reach. According to the 1996-97 progress report, PSSM's program has allowed the incorporation of garden produce in the diet of 130 families in 4 communities.[50]

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[48] Arteaga, L. and L. Paré. 1997. 1996-97 Progress Report to the InterAmerican Foundation. Note that while the project initially distributed *picapica* seeds free of charge in order to help people start using green manures, they decided to sell the vegetable seeds so women would make more of an investment in their gardens.

[49] Solfisia, San Fernando. November 12, 1997.

[50] Arteaga, L. and L. Paré. 1997. 1996-97 Progress Report to the InterAmerican Foundation.

Reforestation and the Prevention or Control of Forest Fires

As described in Section 4, deforestation rates in the Sierra have been very high for the last three decades. Forest areas have been cleared for *milpas* and cattle grazing, or burned accidentally by forest fires which often are due to slash-and-burn clearing techniques getting out of control. The project's efforts to help local people conserve and sustainably use the forest is based in reforestation efforts and the promotion of ways of reducing and controlling fires. Outputs include workshops, videos, and other presentations in the campaign to control fires.

Impacts of Reforestation/Fire Program
positive:
- campaign began during time of heightened awareness of problem of forest fires
- support of SEDAP provided inputs
- people enjoyed dissemination tool (video)

negative:
- it is difficult to combat the less labourious tradition of burning to clear agricultural land

Reforestation

We talked to people in El Pescador, Mangal and Ocotal Chico about the project's reforestation efforts. Around the first two villages, community members planted trees around rivers to protect watersheds and began to reforest the mangrove swamp around the Laguna de Ostion. Environmental issues seemed to be on the forefront of peoples' minds in these areas. For instance, when I mentioned to one man in El Pescador that I was in the area to discuss the work of PSSM, he immediately spoke about their work on reforestation, linking these local efforts to the global imperative of addressing pollution and climate change.[51] People in this area have also begun to plant dense rows of trees to create a living fence for the local deer population. Informants explained that this was part of a management plan that the communities have developed to prevent over-hunting of deer, while still using the herd as a productive resource. Their plan envisions stocking the area with deer and allowing controlled hunting for consumption.

Inputs for this reforestation include both technical input from *promotores* and PSSM staff, as well as physical inputs of tree seedlings from SEDAP (the state Ministry of Agriculture) and SEMARNAP (the federal Ministry of the Environment). As of the writing of Phase II's technical report, the project had supported the replanting of 200,000 trees of native varieties in El Pescador. This program has grown from very small beginnings. A SEDAP official explained that it began with people receiving a few trees to plant around their milpa. The scale kept increasing, until now people are replanting areas by the hectare.[52]

340 people in 7 communities were involved in reforestation in 1996-97.[53]

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51 Suzana Aquino's husband, El Pescador, November 10,.1997.

52 Cora Aceibo, SEDAP, Catemaco. November 14, 1997.

53 Arteaga, L. and L. Paré. 1997. 1996-97 Progress Report to the InterAmerican Foundation.

Control and Prevention of Fires

The project's work on preventing forest fires began during the first phase of IDRC funding. According to Rafael Gutiérrez, the current project leader, 1991 was a particularly bad year for forest fires, with thousands of hectares burning in the Sierra. Thus their campaign began at a time when people were conscious of the harmful effects of careless burning and the need to conserve the forest.

As explained in Section 4, slash and burn agriculture has been the traditional cultivation practice in the Sierra de Santa Marta. Some of these fires have gone out of control from peasants burning their fields to prepare them for the year's crop. PSSM launched a campaign to control fires, encouraging peasants to either not burn at all, or at least use precautionary measures such as pre-burning a small area on the border of your field to ensure the fire won't spread beyond the intended area. They delivered this message through community workshops, assemblies, and a video. This activity also received inputs from SEDAP, including the labour of Corazon Aceibo was seconded from SEDAP's local forestry office to work on this campaign for 7 months in 1991.

Within the Sierra, the campaign seemed to be highly successful in raising awareness on the importance of preventing wildfires. Several of the *promotoras* considered this to be the most important impact they had on their communities, also as a step in facilitating other activities. According to Aaron,

> It was a giant step. It made us aware of the need to control fires, so they don't run wild. Nature began to heal itself. Well, if we are going to control fire, we can also conserve other resources, deer, crawfish. This also led to reforestation, 200,000 trees have been planted.[54]

Doroteo agreed with Aaron that fire prevention was one of the most important impacts of the project. He explains the waves of impact that this had:

> Before, coffee plantations would also catch fire. Medicinal plants had disappeared. From that time, people began to try and prevent wildfires. Now people practice "half burns" or they burn their whole fields but they let others in surrounding *parcelas* know and take precautions. Fire doesn't run free any more. Wildfires were stopped and reforestation came in ... medicinal plants started to come back. This was an important achievement in terms of health.[55]

In a different interview, Corazon Aceibo also related that people from Ocotal Chico went out and fought a nearby forest fire in 1995. This was for her an example of a real change in consciousness in the people, as prior to the campaign communities were not active in fighting fires.[56] Local informants confirmed that PSSM's contributions were central to their increased fire vigilance.[57]

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54 Aaron Landa Soto, *promotor* in El Pescador, at *promotores* meeting, November 9, 1997.

55 Doroteo Chima, *promotor* in Santa Rosa de Hueyapan, at *promotores* meeting, Nov. 9, 1997.

56 Corazon Aceibo, SEDAP, Catemaco, November 14, 1997.

57 Pedro's son, Ocotal Chico, November 13, 1997.

The fire control program has also had impacts on local policy levels. In the town of Pajapan, the communal assembly passed a resolution prohibiting burning parcelas.[58] In Ocotal Chico, there is now a group to control fires, and they strictly enforce rules designed to ensure no fire gets out of control.[59]

According to the 1996-97 Progress Report, 270 people from 7 communities participated in the campaign to prevent fires, and 260 people in 10 communities had unburned blocks.[60] Although we don't have quantitative data regarding forest fires, there seems to be a high level of awareness of forest protection and reforestation. Many people we interviewed said there is less burning now, but it is difficult to say how much less. However, a SEDAP official credits PSSM with a very significant impact in halting deforestation overall:

> If PSSM didn't exist there would be more deterioration [of the forest] in the Sierra de Santa Marta. It would all be pasture! There is no other NGO doing this work. Mathematically, there would be no forested mountain left without them, because it was deteriorating at a rate of 5,000 hectares per year.[61]

PSSM's work on reducing fires and improving soil fertility form part of an integrated approach to conservation and sustainable development. Green manures and erosion control allow peasants to intensify their crop production, and reduce the need to rotate their *parcelas* so often, which means that people don't have to clear new land through burning as much. People seem to be taking them as a package as well, as seen in the words of a municipal official of Pajapan:

> Lorenzo showed us the video about green manure. Aaron [the local *promotor*] was there too. Now the people here are using green manures. Few people still use chemicals. They don't have to burn anymore, because the earth has food. This has given good results, with a plentiful harvest of corn.[62]

In terms of people's attitudes towards the diversification of forest production and the worth of the forest, the advance so far achieved can be summed up by a statement made by Lorenzo as we ended our conversation about *palmas* and *palmeros*:

> Before, the hardest worker was the one that worked faster at cutting down the forest. Today there is a debate among people about the need to cut it down. ... Plots of land with trees are now sold at a higher cost, before they were not worth much.[63]

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58 Faustino Martino Vargas, Consejo de Vigilancia del Ejido, Pajapan. November 11, 1997.

59 Pedro's son, Ocotal Chico, November 13, 1997.

60 Arteaga, L. and L. Paré. 1997. 1996-97 Progress Report to the InterAmerican Foundation.

61 Corazon Aceibo, SEDAP, November 14, 1997.

62 Don Marcos, Sub-agente Municipal, El Mangal, Pajapan. November 9, 1997.

63 Lorenzo Arteaga, head of *promotores* network, PSSM. November 9, 1997.

Non Timber Forest Products

PSSM's work with non-timber forest products (NTFP) include ornamental palms, coffee, vanilla, sangregado and others. This is an area of ongoing research for the project, as well as community organization, and the outputs include the identification of cultivatable species, guides to cultivation and harvest, and producer groups. We will focus our discussion on palms and vanilla.

Factors on impact of NTFPs
positive:
- provides and diversifies income sources
- PSSM works on both product and access to markets
- products are appropriate/traditional to the area
- follow-up support (for the palms)

negative:
- insufficient research for vanilla
- loss of IDRC support interrupted palm project
- long investment time before financial returns

The cultivation of non-timber forest products is a key way the project helps the people of the Sierra find sustainable ways to use the forest, supporting both forest conservation and human livelihoods. The products that the PSSM promotes grow naturally in the forest areas, but some have almost become extinct either because their habitat was destroyed by deforestation (e.g. vanilla), or because of inappropriate harvesting practices (e.g. palms).

Palm Cultivation

Context. *Palma Camedor, Chamaedora spp.* grows naturally in the forests of the Sierra de Santa Marta. We asked Fernando, PSSM's program leader for non-timber forest products, what would had happened if IDRC's funding had never occurred. Without hesitation he replied that there would be no more *palmas* left in the Sierra's forests; in many places you cannot find them any more.

For several decades, gathering palm leaves (for eventual use in flower arrangements, etc.) has been one of the most important means of subsistence for several communities on the edges of the main forest zone. It has helped people make up a significant portion of the deficit in production of maize and beans. Most of these communities are not self-sufficient in the cultivation of these two basic food staples, and must spend most of their income to purchase them. The increasing Popoluca population, the shortage of land for younger generations, the shrinking job opportunities in the closer towns and cities, and the low productivity of the *milpa*, all have combined to increase the pressure on the exploitation of *palmas*. Profiteering by intermediaries also encourages this overexploitation, as people try to compensate for the low prices by collecting and selling more *palma* leaves. Moreover, the plant's habitat is also destroyed by fires and deforestation.

In the past, harvesting palms had been a cause of tension among communities. In anticipation of a buyer coming into the area to buy palm leaves, people would go into the forest to harvest as many as they could (often surreptitiously at night). Conflicts arose because people from one *ejido* collected palms from another *ejido*, an act which is considered stealing. There were also problems with people harvesting without proper care, and destroying the plant in their haste to gather as many fronds as possible instead of just picking the outer leaves.[64]

[64] Andres recalls this being the case in an earlier visit to the Sierra in 1994. That year, the maize harvest had been poor (below 800 kg/ha for many families) and opportunities to work in the surrounding cities

Strategy. A key element of the PSSM's strategy for improving the quality of life of the people and the protection of the environment has been to promote the diversification and sustainability of production systems. In this particular case, it meant to: a) develop a management plan to improve collection practices of wild *palmas* and promote their conservation; b) promote the cultivation of *palmas* in *acahuales* (resting agricultural lands) and coffee plantations; c) develop and implement strategies to obtain better prices for the product (i.e., reduce profiteering by intermediaries); and d) create palm producer groups to organize cultivation and negotiate inter-ejido harvesting agreements.

Outcomes and impacts. During the project's second phase, PSSM carried out nine workshops and six practical demonstration sessions on various aspects of the management and cultivation of palms; 177 *campesinos* attended. Visits to other plantations of the region were also made by 76 *campesinos* to learn from other peasants and private producers with more experience. *Campesino*'s participation in local experiments increased steadily over the duration of the project. By the end of Phase II, three groups of *palmeros* (palm producers) had been formed in the communities of Santa Marta, Mazumiapan Chico, and San Fernando, with a total of 165 members. In September of 1993, an agreement was also signed by the authorities of the three communities to resolve inter and intra-community conflicts that kept arising from the improper extraction of palm leaves in each other's fields. The *palmeros* committed themselves to conserve this resource and respect each other's territory. The agreement was later revised to define restraint areas (non-cutting zones) for the recovery of wild palm populations. By October of 1994, 86 members from these three *ejidos* had transplanted over 60,000 *palmas* of seven different species into house yards, coffee plantations, *acahuales* and surrounding forests.

Then came the end of the IDRC funded projects, and with it, the end of funds to support the work on *palmas*. Even though the PSSM continued with many activities in the Sierra, these were funded on an individual program basis, which did not allow the team the flexibility to provide technical and/or logistic support on many activities that had been initiated earlier. It was not until 1996 that the head of the palm program managed to secure a three year grant from the MacArthur foundation to re-initiate its work on *palmas*. He remarked that the IDRC projects had allowed him to gain the experience and knowledge necessary for him to get the present grant.

Reach. As he went back to the Sierra, the interest and need was as great as where he had left off. Today, the groups of *palmeros* include almost all economically active men in the three ejidos of: Santa Marta (34 members), Mazumiapan Chico (40 members), and San Fernando (64 members). About 80 small plant nurseries (each having from 3,000 to 5,000 seedlings) and over 50 cultivation plots (from .25 to 1.5 ha) have also been established. Regular surveillance by *palmeros* of wild palms and their seeds in protected zones is on-going. New buyers offering better buying prices (double the price than before) have also been obtained through the project's efforts.

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were scarce, which meant people were scrambling to collect and sell as many *palmas* as possible to make up for the increasing income and subsistence deficits. As had happened on previous occasions, there were accusations flying about people trespassing from one *ejido* to another to steal palm leaves.

Factors and Potential. We had the chance to interview a couple of *palmeros* from San Fernando. One of them was the president of the *Sociedad Popoluca de Palmeros* which today has a total of 50 members. Raymundo is a coffee grower, and does not have a *milpa.* He sees revenues from the *palma* as a way to protect himself against the wild fluctuations of coffee prices. His plans are to plant the *palmas* intermixed with the coffee. We visited his nursery, which has over 3,000 seedlings (see photo in Annex). He is very hopeful for the future, especially now that they are getting better prices from the buyer.[65]

The main problem is the heavy investment in time that is needed to set up the cultivation plot and the long term needed to recover the investment. Plants must be tended for four years before you can begin to harvest them (one year in the nursery, then three years after transplanting to either the acahual or coffee area).

The *sociedad* is nevertheless looking forward to be able to sell directly to the international market and avoid altogether any intermediaries. They are conscious that for this to be possible they need to increase production. In order to get better buyers, you need a stable and increased production. Perhaps in two years there would be enough production in the Sierra (about 120 ha of cultivation is anticipated) to attract better buyers. There are problems ahead though. Being an intermediary can be a very profitable business. An intermediary buys from N$3.5-5 the "gruesa" (120 leaves) and can sell it as high as N$35. Mexico is the first exporter of *palmas* in the world, and there is an increasing interest in some government and private circles to take control of the commercialization and keep the profits. However, it seems clear that the sustainability of production of this resource and its positive impact on the protection of the remaining forests lies in the other direction: increasing the share of the profits that remain with the local producers.

Vanilla

Vanilla vines also grew naturally in forests of the Sierra de Santa Marta. However, deforestation has destroyed its habitat, so there is almost no vanilla left in the area. PSSM has tried to promote the cultivation of vanilla in villages in Pajapan as well as in lower areas of Soteapan. The project's inputs included resources to begin demonstration plots, and to send interested people to a workshop in Papantla, a nearby vanilla producing area, to learn how the vines can be cultivated.

Outcomes and factors. Up until this point, the vanilla program seems to only have had a negligible, or even negative impact. Unlike the palm production, the vanilla program does not seem to have been well-researched before local producers were involved. Inappropriate site selection meant that the vanilla didn't have enough shade or humidity to thrive. The vines dropped their flowers, and growers still don't understand why. While there would have to be some on-site experimentation to see how vanilla will grow in this area, issues like adequate humidity and shade could have been researched more thoroughly beforehand, based on experiences in other areas. One man who worked on vanilla cultivation for 5 years seems to resent the large amount of time he put into it, only to find that he got

[65] Another palmero told us that before he would get N$5 for a "load" of palm leaves, now he gets up to N$10 from the new buyer.

no results.[66] Moreover, as this man is the local *promotor* for Culturas Populares, the initiative seems to have caused some friction between PSSM and Culturas Populares.

Potential. Positive income generating impacts could still arise from vanilla production through PSSM. A recent report from the project indicates that a biology student has financing from UNAM to undertake some basic research to reorient the vanilla production initiative.[67] As well, government officials are still optimistic about vanilla in the Sierra. They claim that in their experience, introducing a product like vanilla generally doesn't go well the first time. However, once you've learned from your mistakes in the first trial, you try again, and the product will take off. They assert that the Sierra is actually ten times more suited for vanilla production than Papantla, where production is already underway.[68]

Conclusion

Before making a general statement about the micro level impacts of the research projects, we should keep in mind that during the last two decades, deforestation rates in the Sierra were double the national average, ecosystems continued to degrade, maize yields dropped by more than half in spite of increased use of agro-chemicals, soil erosion remained unabated, food diversity collapsed, and the nutritional status of children under five years of age became one of the poorest in the state and country. All this was happening in an area whose ecological importance had been officially recognized for those two decades, having even a presidential decree classifying it as a protected zone for the conservation of nature and wildlife.

Today, many problems remain. It is hard to assess how much the deterioration of the environment and quality of life of the people have slowed down, and impossible to quantify the impacts of the PSSM's programs on this process. What we can say however, is that the project introduced and/or strengthened key elements at the local level that are necessary to stop and redress these conditions. The project was successful in:

- demonstrating to local *campesinos* and *campesinas* sustainable productive models applied under local conditions (e.g., *green manures-milpa, palmas,* vegetable gardens, ...);
- creating local instances of organization and dissemination (*red de promotores*, producer and conservation groups) with a sustainable production mind-set and coherent strategies;
- institutionalizing at the community and *ejido* levels certain environmental protection measures (e.g., fire prevention, protection of *palmas,* protection of oyster banks);

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[66] Isidro Martinez, Pajapan. November 11, 1997.

[67] PSSM. 1997. Hacia un Modelo de Desarrollo Sustentable en la Sierra de Santa Marta, Los Tuxtlas, Mexico, Periodo enero-agosto de 1997, p.8.

[68] Hector Hernandez and Jesus Dorantes, Dirección Forestal, SEDAP. November 17, 1997.

- rekindling among many indigenous people of the Sierra their traditional respect for Nature, now mixed with a new understanding of the value or worth of the forest and natural resources; and,

- reinforcing the value of a diversified subsistence production.

All these elements remain present today and are likely to become stronger in the future, given the advances towards more democratic and accountable forms of government. Past and present administrations (from federal to municipal) are largely responsible for the poor environmental and social conditions of the Sierra, and up to today, they have been the main obstacle in the path to recovery.

5.2 Meso Level: Organizational and Institutional Development

5.2.1 Community Organizations

A key impact of the project is at the level of process; the project introduced *new ways of working*. In these new ways of working, people organize at the community level into groups in which they together diagnose the problems they face, assess the resources they have available, and make proposals on how to solve their problems. PSSM carried out diagnostic workshops in at least five communities in the Sierra, and has used similar diagnostic approaches with the producer groups that it helped create.

Early project reports state that one of the biggest challenges for the researchers working in Sierra de Santa Marta was the lack of organized producer groups to work with.

> With respect to *campesino(a)* participation, one of the fundamental problems in the region that made our work difficult, was the absence of autonomous organizations of producers, and the existence and activities of organizations which emphasize ideological matters over productive ones.[69]

So one of the project's key activities was to create producers' and community organizations with and through whom they could work. Thus was born the *red de promotores*, ecological committees, women's groups, and product-specific groups, like palm producers or vanilla producers. The project's ability to pull together groups of people with disparate political and religious affiliations is a remarkable achievement, and sets them apart from many other NGOs in the region. As highlighted in Annex A4, the project's aim to bring together people of all persuasions requires constant work at maintaining trust.

Red de Promotores

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[69] PSSM, A.C. and Carleton University. 1995. *The Sierra de Santa Marta Conservation and Sustainable Development Program. The Sierra de Santa Marta Bio-Economic Reserve: Experimental Participatory Research, Phase 2. Executive Summary.* [English version] Xalapa, Veracruz: PSSM.

The *red de promotores*, formed during the second Phase of IDRC funding, is one of the project's most important outputs in ensuring the sustainability of impacts.[70] Toward the end of Phase II, when the project team realized that IDRC might not fund their Phase III proposal, project leaders began to question what would become of the *promotoras*. When asked, the *promotores* decided that they wished to consolidate as a network, and continue their work in experimentation, demonstration and promotion, regardless of the status (or existence) of the PSSM. Since 1994, the *red de promotores* has received funding from the InterAmerican Foundation and the Rockefeller foundation for their own training and work in peasant-to-peasant dissemination. The *red* now functions semi-independently from PSSM. They organize some of their own experiments and activities, though still requiring support from PSSM in their meetings, technical support, and help to access other funds.[71]

As mentioned in section 5.1, the *red de promotores* is both a first level of reach for micro-level impact, a mechanism for further reach, and a factor facilitating impact of the community-level programs. However, the network as an organization also has impacts of its own. These are three-fold: impacts on the *promotoras* themselves, on the communities in which they work, and as an example to organizations and communities beyond the Sierra.

Annex A3 summarizes the *promotores'* responses to our questions on the impacts of being a *promotor/a* on their own lives, the achievements of their work within their communities, and their impact beyond the Sierra. The themes that emerged show that many of them decided to become a *promotor/a* because they themselves were interested in learning more about soil conservation, improving their own farm production and livelihoods. Above all, the *promotoras* are eager to learn, and want to share their learning for the betterment of their neighbours' livelihoods. Many of them also had a keen conservation mind set, being convinced of the need to protect the forests, the mountain, the rivers and animals in the Sierra.

The impacts of belonging to the network for members themselves were primarily on this level of learning and improved production. They also cited impacts of overcoming shyness, and having a stronger sense of self-worth having things to share with their neighbours. Women described feeling more free and stronger in the knowledge that they too are involved in production, and that they are able to provide for their families despite cultural factors that leave them disenfranchised.

The organization of the network facilitates other types of impacts. The network's monthly meetings rotate among different communities, which give members the opportunity to visit each others' plots and see first hand local experiments and achievements. As a network, the *promotores* coordinate

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[70] As explained in Section 5.1, the *promotores* are *campesinos* who live in the Sierra, many of whom had already developed leadership qualities before they began to work with the project, though not necessarily in agricultural, production or environmental contexts. The innovation of the network was an output of PSSM's efforts, and their own desire to work and learn together.

[71] In the report from an institutional strengthening workshop that PSSM had in December 1996, the facilitator suggested drawing two overlapping circles denoting the project team and the *red*. The circles suggest that the project team and the *red* work on some things together, however, each has activities that the other is not involved with. *Memoria del Taller de Fortalecimiento Institucional del Proyecto Sierra de Santa Marta, A.C.* December 5-7, 1996, p.18.

experiments and activities together, reporting on progress and sharing suggestions on how to overcome problems. Minutes of previous meetings show that the network's agenda is full of reporting on experiments, markets for coffee, visits to demonstration plots, workshops, problems of diseased crops, and upcoming training opportunities. They also discuss the political and policy climates which affect their work.

Within their communities, the *promotoras* claimed to have had significant impacts in fire prevention and control, increasing the use of *abonos verdes*, improving *milpa* and *solar* production, decreasing use of agro-chemicals, increasing number and use of latrines, increased consciousness about men and women working together, increasing conservation of forests and fallow land, and diversifying production with non-timber forest products and in the *milpa*.

Although the reach of individual *promotoras* is primarily limited to their own communities and a couple neighbouring ones, they do sometimes go beyond the Sierra; *promotores* gave examples of being invited to share their experiences and experiments with other communities, even as far as Chiapas and Campeche. Two *promotores* suggested that "no one can be a prophet in their home town",[72] and that they actually had more of an impact when they did workshops and visits outside the Sierra. Even at the single meeting that we attended, it was clear that the project team invited members of the *red* to numerous training workshops and seminars, as well as to other fora at which they could also give their perspective on development in the Sierra. Moreover, in this meeting, the network presented a proposal to the PSSM team to build a regional orientation centre for the network, which would be the site for the network's meetings, workshops, to house the results of their experiments, and serve as a coordination centre for the activities of the *red* beyond the Sierra. It would also give them increased visibility within the Sierra.

It seems that the key reasons that this network of peasant extension workers has been so effective in the Sierra include the following: the *promotoras* experiment themselves with innovations and to make them work and fit local contexts; the project team highly values their input, and are willing to be shaped by the *promotores'* suggestions; and the techniques and technologies being promoted themselves try to build on indigenous ways of doing things instead of introducing something foreign.

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[72] Gabriel Angel Cruz, promoter from Pajapan, November 9, 1997.

Women's Groups

The women's groups have had impacts in increasing and diversifying vegetable production and thereby improving peoples' diets in the Sierra. They also support other production and income generating activities, and hold awareness-raising workshops on issues of human and indigenous rights. Women's groups are not easy to organize in the patriarchal[73] indigenous cultures in the Sierra. The *promotoras* spoke of their difficulty in trying to form women's groups. In one community, they realized that they initially had to invite men to the group, lest the men not allow their wives to attend.

Reach. The project has female *promotoras* only in the Popoluca area of Soteapan. The two women work in the municipal capital (where they live), as well as in other areas, mobilizing local women's groups which do kitchen gardens, workshops on sewing or to demonstrate a fuel-efficient stove (*estufa lorena*). Of the project personnel, one female researcher involved in gender issues also works in Soteapan, and has hired another woman to be a *promotora* in some of the more rural villages in the area. This third *promotora* lives in Xalapa, and is not formally part of the promoter's network.

PSSM has no *promotoras* in the Nahua areas, and it doesn't seem likely that there will be in the near future. The head of the women's programs suggested that given the project's limited resources, it is more important to consolidate the project's efforts in Soteapan than to extend their work to Pajapan. Even so, PSSM has co-sponsored a couple of workshops in El Pescador, and other PSSM personnel have been involved in these. Moreover, women have organized in El Pescador and Mangal, either for specific tasks like sharing the communal sewing machines or ovens, or through the Catholic group, *Fomento*.

The limited time available did not allow us to assess the extent of activity of the women's groups. The groups do exist. Their members are conscious of the benefits and consider the work a worthwhile activity. Active participation seems to depend on the availability of the women's time, their health, as well as access to a minimum of inputs.

Factors. The level of women's organization in the Sierra communities varies considerably, and there seem to be a multitude of factors that influence the project's ability to initiate and sustain these capacity-building groups. One factor is the community's previous experience with organizing or other organizations working in the area. For instance, people in Ocotal Chico saw PSSM's work in women's organizing as direct competition to the *Programa de Educación Initial*, a government-run parenting support group. Moreover, the local *promotores* who would have supported this women's group were not available to work extensively in the area. The project's work with women in Ocotal Chico faltered. PSSM has restarted this work recently, this time with the external *promotora* taking a lead role. However, there are still dynamics to work through, including the difficulties of one person in the group being paid to be there (the *promotora*), and others' expectations that that person

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[73] For a description of patriarchy among the Nahua, see Jacques Chevalier and Daniel Buckles. 1995. *A Land Without Gods: Process Theory, Maldevelopment and the Mexican Nahuas*. London and New Jersey: Zed Books and Halifax: Fernwood Publishing.

should do all the work.[74]

Political interests also influence the project's impact in community organizing. One of the *promotoras* in Soteapan explained that it is more difficult to get a women's group going in the municipal capital than in smaller communities, because the divisive impacts of political interests are stronger in the capital.[75] (See Appendix A4 for an example of political obstacles to community development.) Another *promotor* suggested that the sheer size of the population in municipal capitals makes it harder to get people organized.[76]

Impacts. One of the impacts of the women's group is in allowing members to develop a broader perspective. Lourdes has invited women from these groups to annual meetings of Mexican indigenous women. In fact, the next annual meeting is scheduled to be held in the Sierra de Santa Marta. This broadened perspective becomes visible, for example, when women from one community invite groups from other communities to the workshops they plan, or when the women's group in San Fernando ensured that their proposal for seeds and gardening tools and materials included enough to share with women from a neighbouring community.[77]

In keeping with PSSM's approach of supporting groups to develop their own projects, the women's group in San Fernando, including 72 women, submitted a proposal to INI (Instituto Nacional Indigenista) to fund their vegetable garden project. When their proposal was not favourably answered and bad feelings began to develop between the group and the project, PSSM sponsored 3 people from the community (two women and one man) to go to INI's office in Acayucan to find out for themselves the status of their proposal. This type of support has built the political consciousness of the group, and helped to restore trust between the group and the project.

The impact of the women's groups on changing gender relations was also difficult to assess in the short visits we had in the Sierra. The *promotoras* from Soteapan stated very clearly that their work with the project has helped them see that they too have a critical role to play in sustaining their families, that women can work in the *milpa* just as well as men, and that their work has helped them feel free and capable.[78] The story of one *promotora* shows an incredible transformation from being abused by her husband to them now working together in the *milpa*, and him taking up her suggestions of green manures and diversified production. While other conversations with people in the Sierra did not necessarily reveal such clear articulations of transformed gender relations, the fact that women's

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74 Lourdes Godinez, head of women's programs, November 16, 1997.

75 Mere (Hermenegilda) Mateo, Soteapan. November 12, 1997.

76 Gabriel Angel Cruz, Pajapan. November 10, 1997.

77 Lourdes Godinez G. November 16, 1997.

78 Women's contribution to household sustenance seems to be continually undervalued. Even a student who once worked with PSSM asked one of the *promotoras* why she was involved in the *red*, given that she didn't even have a *milpa*. He failed to see the work she was doing with household gardening, small livestock breeding and raising, and other income generating activities.

groups exist in some of the communities is itself an indication of a significant impact, since some men initially prohibited their wives from joining the group.

Palmeros

The story of the palm producers was covered in section 5.1. However, it is worth noting that the *Sociedad Popoluca de Palmeros* has been instrumental in forging the inter-ejido agreements of harvesting and conserving the wild palms. The *Sociedad* also seems to be a well-recognized independent body in San Fernando. When we mentioned to a *campesino* in a rural taxi that we were going to talk to the PSSM *promotor* about palm production, he didn't think that made sense. He recommended instead that we talk to Raymundo, the president of the *Palmeros*, or to the secretary. The society appears to be seen as an independent organization, rather than a subsidiary group under the direction of the local *promotor*.

Local Ecological Committees

Beyond the *promotoras* and producer groups, the project also initiated a number of community-level ecological committees. In the case of Mangal, the ecological committee is called *El Comite de la Defensa de la Laguna*, since its main activities revolve around conserving and promoting the sustainable use of the Laguna de la Ostión and the waters that flow into it. The Comite was formed as a result of a 9-day diagnostic workshop that PSSM undertook in the community in 1995. It has coordinated reforestation in the lagoon (36,000 manglares) as well as along 9 km of rivers. The local committee joins with similar committees from other communities around the Lagoon to address issues that concern them all. Especially in this case, it was striking that despite the Sierra being a nationally protected area, there is no government plan being implemented on the local level to manage or conserve the resources in the area. SEDAP did provide some seedlings for this reforestation, but only in response to the committee's request. The reforestation of the lagoon seems to be managed by these committees of local people, born from processes that PSSM helped begin and continues to support.

5.2.2 The Project Becomes an NGO

During Phase II of IDRC support, the project team incorporated itself as an NGO, an *asociación civil*, under the name Proyecto Sierra de Santa Marta, A.C. The IDRC support served as core funding to the nascent institution, allowing it to define its internal relations and systems, and to experiment with certain activities.

> I believe that the present status of the PSSM was achieved, obviously through the work of each of its members, with their different paces, abilities, passions and defects. However, I believe that the

creation of an integrated team, sometimes harmonious and other times in disequilibrium but always honest in its work, would not have been possible without the financial support of IDRC.[79]

Since the beginning of IDRC funding, project leaders sought to build a flexible, interdisciplinary team to undertake research and develop community organization. According to one of the principal investigators, throughout phases I and II, the team became "a network of people involved in research with a development objective, not closely knit, for there were different people at different times, with many agencies involved."[80] The team now includes 11 full-time, permanent staff from different disciplines, including anthropology, sociology, geography, biology, and other academic specialties. In addition, there are support staff, the network of *promotores*, numerous students whose work in the Sierra is integrated into the project, invited advisors (who now include the two Canadian former principal investigators), and consultants. The strengths of PSSM as an NGO are its commitment to the Sierra and its people, strong academic qualifications, responsiveness to the needs and priorities that arise through participatory action research, and a political awareness, linked with an ability to bring *campesinos* together across otherwise divisive social lines. All of these has helped it bring about positive impacts in and beyond the Sierra.

Becoming an NGO allowed the team more freedom and flexibility to develop their own plans for the future and search for complementary funding, since they were no longer housed under the UNAM. Under UNAM, only the first project leader was an employee of the university, and the project existed with something as a circumscribed lifespan. As an NGO, the team could try to secure more funding and develop their own strategic direction. They gained recognition as an independent interdisciplinary group of researchers and practitioners.

The NGO has developed working relationships with several government ministries. SEDAP officials assured us that their relationship with PSSM is unique, for no other NGO has gained their respect and cooperation in the same way. This respect is based on PSSM's solid research basis, their interdiscplinary knowledge of the realities of the Sierra, and their strong relationship with people who live in the Sierra. PSSM also has relationships with SEMARNAP, which will be discussed further in Section 5.3.

PSSM also enters into relationships with other NGOs. For instance, PSSM has recently begun to contribute to training workshops by the Centro de Estudios Sobre la Municipalidad (CESM) in the Sierra. That relationship also brought the project to a CESM-sponsored municipal political dialogue within the city of Xalapa during last October's elections.

PSSM formed when the number and strength of peasant organizations was increasing, challenging the hegemony of government control and clientalism in rural areas (c.f., section 4.3). This context probably facilitated the group's efforts at establishing themselves and finding a niche as an NGO.

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[79] Emilia Velázquez H. PhD candidate at CIESAS, former researcher with PSSM, in written response to the four questions we sent to the project team, November 1997.

[80] Jacques Chevalier, Carleton University, September 25, 1997.

PSSM remains a functioning NGO. After having gained a number of task-specific grants from international donors, the team looks forward to receiving core funding from the Dutch agency NOVIB that is also aimed at institutional strengthening; they hope to use some of the flexibility of this funding to work through some internal issues as a team and develop a more strategic plan for their work in and for the Sierra.

Conclusion

Meso-level outputs facilitate impact on micro and macro levels, for organizations can be important to enhance reach and facilitate the sustainability or degree of impact. This is evident in the case of the *promotores* and women's groups supporting micro-level programs such as green manures or vegetable gardens. Being involved in organizations can also create impacts of changed outlooks or improved capacities for those individuals involved. On the macro-level, the project's becoming an NGO has allowed it to enter relationships with other NGOs and government ministries which have been avenues to advocate for policy and program changes. It is to these that we turn in section 5.3.

On the micro-level, the following characteristics of the community organizations and producer groups facilitate impact:

- being made up of community-members, the groups are well-grounded, able to communicate effectively and with a consistent presence for follow-up and problem-solving;
- the PSSM takes seriously the proposals that arise from these groups, and will facilitate relations between these groups and government ministries (e.g., to get seedlings from SEDAP, or work out their garden proposal with INI);
- groups form around production, so they can speak across religious and political divides; and
- since the *promotores* are both men and women, they can share experiences and strategies across gender barriers.

However, there are also factors which hinder the ability of these groups to function:

- trouble in starting a new group where others exist already;
- problems associated with some people being paid by the project, e.g. some community members think that *promotoras* should do all the work because they are being paid;
- difficulties getting groups to form in municipal capitals, or in places where political histories make it difficult to form new groups.

5.3 Macro-level Impacts: Policy

The impact of the project on government policies and programs relate to both specific commodities and general planning for the region.

The project was able to achieve a significant macro-level impact during its first phase of IDRC funding. A $16 million eucalyptus plantation was planned for the Pajapan area, to be developed by a multinational America-based firm and supported by SEDAP. This mega-development would have created a lot of changes in the region, and the project looked into its possible environmental and

social ramifications. The team facilitated community discussions about the plantation, and the people decided they did not want it. Thus ensued an active campaign against the plantation, with the project undertaking further research on the development, and lobbying SEDAP to prohibit the plantation. In the end, the plantation was not created in Pajapan, but rather outside the borders of the Sierra. This was a victory for the team, providing them with significant exposure nationally as well as internationally (the IDRC project file shows that PSSM grew to be expert advisors on eucalyptus). Blocking the eucalyptus plantation spurred the project to undertake more action research into productive alternatives that could help people in the Sierra meet their livelihood needs, now that a large money-making opportunity was gone.

On other specific items of policy impact, a SEDAP official explained that her regional office had very few activities in the Sierra, and began working in communities in Santa Marta largely through PSSM's links. PSSM helped community groups in Pescador, Carranza, Ocotal Chico, Pajapan, and Tatahuicapan to propose forestry projects to SEDAP, and the ministry agreed to support them.

PSSM has contributed to government institutions' recognition of the importance of non-timber forest resources to the economy of Sierra communities. For example, priority has been given to the production of *palma camedor* seedlings in the forest nursery of SEDAP in Catemaco. Also, SEMARNAP is now giving financing priority to this type of sustainable agroforestry project.

Even so, the relationship between PSSM and SEDAP is an interesting example of how impact is out of one's hands as a researcher. SEDAP officials stated that while PSSM uses a "bottom-up approach", they use a "top-down" method. While PSSM promotes small-scale diversified community based production, SEDAP assists private firms start plantations in the area. Even with large differences, these officials claimed that their plantations are "based on things that PSSM is promoting".[81] So while PSSM would distance themselves from SEDAP's plantations, SEDAP claims allegiance with the project. (Another interpretation of PSSM's bottom-up, *campesino-a-campesino* approach is precisely to ensure their programs have a positive impact for the people, despite government policies.) The interviews we did for this case study were very subjective, and tended to leave these sorts of inconsistencies in our data. However, it does point to an interesting issue in the impacts of development research: research produces ideas, techniques, approaches, etc., that become "public domain", available to be used by other organizations or within government. Impact only happens when people within those communities or organizations take up the ideas and implement them in some way. The way they do so is not entirely in your control as a research team, and people may cite your influence in initiatives that you never intended.

Another indication of impact suggested by PSSM is the change in the policies of the Instituto Nacional Indigenista (INI). Previously, INI had promoted the use of agrochemicals in coffee and corn production. People in the Sierra claimed that they began to use agrochemicals when INI brought them in. However, now INI encourages alternative agricultural inputs, and alternative production models that are compatible with those that PSSM has started in the area.

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[81] Jesus Dorantes, Director, Dirección Forestal, SEDAP, Xalapa. November 17, 1997.

Based on our interviews with government officials and project personnel, we conclude that the project is now in an excellent position to have an impact on federal-level regional development and land use policies in the Sierra de Santa Marta. Many of the policy impacts stem directly from the project's work that began during its IDRC-sponsored phases. However, the path between research and policy-level impacts is quite complicated in most cases, and especially so in the case of Mexico. In the case of PSSM, it was partly based on personal relationships between project personnel and decision-makers, and dependent upon other donors allowing the project to enter new relationships with government departments.

On the first level, a number of informants said that the most important impact of the project was to draw attention to the Sierra de los Tuxtlas as an ecologically important area.[82] According to SEMARNAP's Director of the Los Tuxtlas Reserve, PSSM's work was central in "giving life to the decree" that the region should be a biologically protected zone.[83] Their analysis of the region's biodiversity, geography, and other characteristics, and their initial plan for its conservation and sustainable development made their way into policy circles (the plan was co-sponsored with SEDAP), and into the national consciousness. Before the project, Los Tuxtlas was generally considered to be a small piece of biological reserve coordinated by UNAM (700 ha), but the project made the whole region much more well known. Moreover, while the Instituto de Ecología in Xalapa was also researching the ecology of the region, the project used an interdiscplinary analysis which highlighted the social, economic and political forces that affect conservation and sustainable development.[84]

The region has become so well known that it has been included as one of twenty national plans for regional sustainable development, PRODERS (Programa de Desarrollo Regional Sustentable). In conjunction with the Universidad de Chapingo, PSSM developed a proposal for a PRODERS for Los Tuxtlas, which was accepted by SEMARNAP during the time that we were in Mexico doing this study. The plan is to be implemented through the municipal governments of the region starting in the next fiscal year.

Secondly, the project has been commissioned to write one part of a resource management plan (*ordenamiento*) for the region through another section of SEMARNAP; the other section will be written by the Instituto de Ecología in Xalapa. Finally, they seem to have the ear of SEMARNAP's new director of the reserve, who praises their research, their approach, and orientation to sustainable development instead of pure economic growth.

As mentioned above, the fact that PSSM has a strong voice in these national policy dialogues is not solely attributable to IDRC's support. While the project did much of its basic research and drafted

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[82] Javier Laborde, Researcher, Instituto de Ecología, Xalapa. November 18, 1997. Lourdes Godinez and Fernando Ramirez, Researchers, Proyecto Sierra de Santa Marta, Xalapa. November 16, 1997.

[83] Antonio Gonzales, SEMARNAP, Director de la Reserva, Xalapa. November 17, 1997.

[84] PSSM's conservation and development plan is built around peoples' livelihoods. Thus, their suggested "nucleus zone" (the areas that should be given the highest degree of protection because they are biologically sensitive) are drawn along the borders of communal lands (*ejidos*), even if that doesn't fit exactly with ecolgocial boundaries seen by other stakeholders, especially the Instituto de Ecología.

its first conservation and sustainable development plan through IDRC funding, subsequent funding allowed PSSM to strengthen institutional relationships with federal policy makers. A number of months after IDRC funding ended, PSSM took on a project through the Global Environmental Facility to apply an incremental costing methodology to determine the costs of mitigating the negative environmental effects of economic development in the Sierra. GEF was interested in PSSM because of its solid base-line data of the area, its community links which facilitate the collection of additional information, and its commitment to sustainable development. Receiving GEF funding provided the PSSM a higher level of exposure and respectability. Moreover, GEF has committed to covering the incremental costs of realizing the sustainable development plan for the Sierra through SEMARNAP, and PSSM is to be involved in this follow-up, further solidifying the working relationship with the federal ministry. However, this work has been delayed and the project team is unclear when it will proceed.

Another factor facilitating policy impacts is the stature of the former project leader. Luisa Paré is well respected by the federal Ministry of the Environment. It is clear that Luisa's profound knowledge of the Sierra, her personal credibility and strength of character has allowed the project to gain an audience in both government and academic circles. A researcher at the Instituto de Ecología emphasized that there are two people whose approval you must get before attempting a new program in the Sierra: one is the Instituto's head of studies in the Sierra, Sergio Guevarra, and the other is Luisa Paré.[85] Luisa's reputation still dominates the project, even if she is no longer the project leader; officials at SEDAP said "we know that PSSM has a new coordinator, but we still see Luisa as the leader".[86] While this can cause difficulties within the project team, it contributes to the respect people accord to the PSSM.

While it is clear that PSSM has a voice in policy discussions, and that some of its proposals may well be implemented through federal programs, the policy context in Mexico is such that it is unclear what effects all these initiatives will have. For one thing, government policies that affect the Sierra often contradict one another. For instance, while one department, SAGAR (through the PROAFT program), is promoting reforestation programs, another agricultural program (PROCAMPO) actually encourages deforestation because it promises agricultural subsidies based on the number of hectares planted exclusively with corn. In order to get better subsidies, *campesinos* cut down more trees for monocrop corn production. Thus, promoting policy change toward sustainable development is not merely a matter of convincing a monolithic government of your cause, it requires analysing the internal inconsistencies in the government, and addressing its various components separately.

Inconsistencies also exist between the state and federal level. Discussions with SEDAP revealed that this ministry focuses heavily on large-scale private sector plantation development and promotes chemical-intensive agriculture in the Sierra. Even while the officials that I spoke to in SEDAP claim "brotherhood" with PSSM, it became clear there are vast ideological and practical differences between them. At the federal level, SEMARNAP's new policies for the region seem to be more compatible with the "bottom-up" sustainable development and diversified production models posited

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[85] Biól. Javier Laborde, Researcher, Instituto de Ecología, Xalapa. November 18, 1997.

[86] Biól. Hector Hernandez, Dirección Forestal, SEDAP, Xalapa. November 17, 1997.

by PSSM.

Yet even federal policies affecting the Sierra have problems and inconsistencies. Within SEMARNAP, a single federal department, several programs addressing regional development, land use planning, and resource planning for the Sierra seem to work in relative isolation from one another. The PRODERS proposal that PSSM co-wrote is to be implemented through municipal governments over the next fiscal year. However, just before the PRODERS was adopted in a public meeting, the Minister of the Environment announced in the newspapers that the *ordenamiento* for the Los Tuxtlas area will be finalized by next April and given to the municipalities to implement. When an informant asked the head of the PRODERS program how this *ordenamiento* would relate to the PRODERS, he said he didn't really know much about it.[87] Moreover, last January a third program within SEMARNAP created a new position of director of the Los Tuxtlas reserve. This director is defining his role as negotiating among government departments, private sector enterprises, NGOs and community stakeholders to come up with sustainable development programs in the Sierra. However, he has not been given an operating budget, and is currently looking for international funding to form focus groups and hold community planning meetings to come up with projects and a regional development plan. While PSSM has a voice in the PRODERS, *ordenamiento* and with the Director of the Reserve, it seems that these three programs do not coordinate their activities nor their plans. Perhaps PSSM's contribution to each of these programs will ensure some coherence among the policies and programs that emerge.

Conclusion

PSSM's impact on policies and programs affecting the Sierra region have been facilitated by several factors. First, the project's solid interdisciplinary research allows it to develop policy recommendations that are technically and socially realistic.[88] Second, policy makers and other researchers respect PSSM's strong relationship with the people who live in the Sierra, and acknowledge that PSSM advocates on the peoples' behalf. One official related that PSSM is seen as the "defenders of the people";[89] The project's role in stopping the eucalyptus proposal was key in shaping this reputation. Third, the former project leader's reputation, skills, strategic sense and her connections to policy-makers strengthened PSSM's academic and political reputation.

6. Enhancing Impact

The PSSM has had positive impacts in conserving the resources of the Sierra de Santa Marta and improving the livelihoods of the people who live there. This work is very slow, however, and it

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[87] Biól. Javier Laborde, Researcher, Instituto de Ecología, Xalapa. November 18, 1997.

[88] One official suggested the first conservation and development plan was unrealistic because it would be too expensive to implement. Alfonzo Olmendi, Catemaco, November 15, 1997.

[89] Cora Aceibo, SEDAP, Catemaco, November 14, 1997.

struggles against powerful forces that results in environmental destruction and the impoverishment of the majority of people who live in the Sierra. The development goals that the PSSM set out to achieve remain pertinent, and require consistent effort to research, experiment and promote alternatives that ensure social equity, environmental protection and local participation. Thus, one way to enhance the project's impacts is for the PSSM keep on with its work on the green manures, diversification of food production, reduction of fires, reforestation and non-timber forest products, among other activities. This could get to be more hands-off as the *promotores* and producer groups gain experience in doing their own research and experimentation.

The PSSM could gain more exposure for the issues in the Sierra as well as their own research by working harder at publishing and disseminating books and articles on their work. PSSM came out with a new book in 1996, but most copies remain in a closet in their office. Even though it was co-published through UNAM, it didn't seem to have made it to most academic libraries, and many people I talked to didn't have copies. PSSM personnel also mentioned that there is another book in stalled manuscript form that should have been published a while ago.

The PSSM's role in lobbying that state and federal government policy in the Sierra supports sustainable development remains crucial. They are well-positioned to have impacts on these levels, and should continue to maintain a presence here, especially as some of SERMANAP's policies and plans move toward finalization and implementation.

One area that seems to have been given insufficient attention by the research team is municipal-level planning. Project documents indicated the difficulty in working with municipal governments because of their anti-democratic tendencies. This level of government, however, exerts a significant control over communities in the Sierra. Given the recent apertures to more democratic processes and the present plan of the federal government to implement the PRODERS through municipal governments, it becomes more necessary than ever to develop strategies for working with them. The relationship of PSSM with CESM could be an important mechanism in advancing the social and economic sustainable alternatives in the coming years.

7. Assessing the Potential of the Project as a Case Study for Public Relations

The research project incorporated many elements IDRC has promoted for many years:

- Research for Development
- North-South Collaboration
- Empowerment through Knowledge
  (a central theme in group interview with *promotores*)
- Capacity Building in Research (a central theme in interview with PSSM)

The project's story also offers a good example of the inextricable link between sustainable development, social equity and democratic change. It offers a good opportunity to present an upbeat (positive but not simplistic) illustration of how protection of the environment and community development are not mutually exclusive, but rather interdependent.

At the consciousness raising level, attention could be focussed on the people that make up the *red de promotores*. They are local *campesinos/as* with a well articulated respect for their culture, a social conscience charged with idealism, an eager desire to learn, open to innovations, and determined to improve their quality of life and that of their fellow *campesinos/as*. You can find many people like this throughout the country in rural and peri-urban communities, but it is an image that the wealthier sectors of society and government are unaware of or choose to ignore.

8. Conclusion

From the very beginning, the research team made the application of research results its responsibility. This conviction helped shape most outputs of the research project (information, ideas, products and actions). Local organization, local experimentation and *campesino*-to-*campesino* dissemination were used as key tools to link research and development. There was in this first research project, and continues today among members of the research team and *promotores*, a very conscious effort to use the products of their research and experimentation to effect changes in the quality of peoples' lives.

It is often thought that participatory, action-based research projects will be more likely to have significant positive impacts on those they attempt to reach. In the case of PSSM, the following are some of the characteristics which suggest that the project was genuinely participatory:

- the project team facilitated communities devising their own plans for action. They spent time helping communities diagnose the challenges they face and resources they have, then helped guide them devise an action plan to meet their challenges. In the case of El Mangal, this process took nine days;
- the key researchers had had many years' previous experience in the region, and spent time getting to know the cultural, social, economic and political realities of the people;[90]
- PSSM takes very seriously the *promotores'* proposals and experiments. They help find resources to support their activities and provide technical advice;
- the project brings people from the Sierra to fora like policy meetings and meetings of indigenous women, to ensure that the people have an opportunity to speak for themselves, and that they get exposed to influential circles that broaden their awareness; and
- rather than being dogmatic about their research results, the team encourages people in the Sierra to experiment with productive alternatives, or alternatives to *picapica*, and adapt project outputs to suit their realities.

These characteristics have helped ensure the project's activities are relevant to the people in the Sierra, and helped make their dissemination strategies effective. Moreover, this project's efforts to create *campesino* organizations in the Sierra were crucial to ensuring that its research outputs had intermediaries to carry them through to implementation and follow-up on their impact.

The project undertook quite a variety of activities, from basic research, lobbying, agricultural

[90] Although we didn't gather sufficient data on this to discuss it in detail, the project has attempted to undergird its practical activities in the region with a respect for, and explicit recapturing of, indigenous worldviews.

experimentation, community organizing, dispute resolution, etc.. According to one of the principal investigators, this approach was essential to addressing the complex issues facing the Sierra, because "you cannot overspecialize in sustainable development."[91] However, while this approach seemed to be mostly positive because it allowed the project to address development and planning in the Sierra in an integrated manner, it had the drawback that the team had so many activities to deal with that some of them may have suffered from insufficient attention. This seems to have been the case, for example, with the vanilla production.

As far as IDRC's role in the project is concerned, the Centre can be seen as having a catalytic role for the outcomes and impacts of PSSM. The Centre provided initial funding, and allowed the team enough flexibility in its activities that it could respond to the needs and priorities of the people in the Sierra. However, IDRC halted its funding abruptly at the end of Phase II, even after having provided the team with bridge funding so it could write a proposal for Phase III, and the Centre provided no support to help PSSM link with other donors. This may have been understandable given that IDRC was facing its own funding cut-backs, but it made things very difficult for PSSM.

Our study identified and provided evidence of a number of impacts, even though no attempt was made to quantify them. As discussed earlier, the limitations in time and financial resources made this impossible, in addition to the difficulties associated in trying to quantify the slowing down of complex processes of socio-economic and environmental degradation. Whenever possible, we have cited indicators of reach in terms of numbers of people trained, or belonging to producer groups, etc.. We derived some of the quantitative estimates from project reports written since the end of Phase II of IDRC funding. When documents lacked estimates of impact and reach for certain activities, we relied mainly on the perceptions of the researchers and *promotores*, validating these through site visits and casual discussions with several local people from the Sierra, as well as through a number of interviews with NGO and government officials knowledgeable of the area and the work of PSSM.

Specific conclusions regarding outcomes and impacts have been stated at the end of each sub-section of chapter 5. These will not be repeated here, except to point out that in many ways, the expected outcomes of both project phases supported by IDRC were surpassed. The social and economic sustainable development plan for the Sierra Santa Marta that the research initiated was given official recognition in November 1997 by the federal ministry responsible for the environment. Regarding the applied research, the regional process for training local villagers and for grass-roots experimentation is also very much alive today, embodied in the network of *promotoras*. Much remains to be done, but key elements are in place, and democratic openings appear, at least for now, to offer real opportunities for change.

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[91] Jacques Chevalier, Carleton University, September 25, 1997.

Annex: Photos

Appendix A1. Itinerary, Interviews and Bibliography

Itinerary and Interviews

September - October

Review impact study concepts, framework, project files and documents, and set up interviews and field work

Thursday, November 6

travel Ottawa - Xalapa, Veracruz, Mexico

Friday and Saturday, November 7 and 8: Xalapa

meet with team members of Proyecto Sierra de Santa Marta in Xalapa
outline major activities, outputs and impacts of the project
plan itinerary for field work in the Sierra de Santa Marta

Lorenzo Arteaga, head of the promotor's network
Rafael Gutiérrez, current project coordinator, geographer
Luisa Paré, former project leader, anthropologist
Fernando Ramírez, forestry product researcher, biologist
Emilia Velázquez, former women's group coordinator, anthropologist
Noé Villegas, works in low zones of Pajapan, marine biologist

travel to Catamaco

Sunday, November 9: Catemaco to El Pescador

meeting with the *red de promotores* in El Pescador:

Doroteo Chimal Gonzáles, promotor in Santa Rosa
Gabriel Angel Cruz, Pajapan
Aaron Landa Soto, El Pescador
Soli Martínez, Pajapan
Victor Chapol Xoca, La Carranza
Manual Matéo Evangelio, Catamaco
Lucio, San Fernando (was standing in for Melquiades Cruz Rodriguez)
Santos Franco, Soteapan
Mere (Hermenegilda) Mateo, Soteapan
Minerva Cruz Cervantes, Soteapan
Chano, Amamaloya

PSSM Personnel Present:

Rafael Gutiérrez, Coordinador
Noé Villegas, marine biologist, works in low zones around La Laguna de Ostión
Sergio Martinez, communication director
Lorenzo Arteaga, head of *promotores* network
Balente Herrera

Andres returns to Soteapan with *promotores* and goes on to Mecayapan with PSSM personnel.

Tricia stays in El Mangal and talks to:
Don Marcos, Sub-agente Municipal
Aaron and Sara Landa Soto. *Promotor* and campesina

Monday, November 10: El Mangal, El Pescador and Pajapan
Felipe Lerdo, President of the Lagoon Defense Committee, El Mangal
Alejandrino Rivera, Comisario del Ejido, El Pescador
Suzana Aquino, Campesina involved in *solares* program, El Pescador
Noe Villegas, PSSM team member, El Pescador
Gabriel Angel Cruz, *promotor*, Pajapan

Tuesday, November 11: Pajapan, Tatahuicapan
Isidro Martinez, promotor from Culturas Populares, Pajapan
Faustino Vargas, member of the *Ejido* security committee, Pajapan
Mauro Maurilio, shopkeeper, Pajapan
Juan Revilla, primary school principal, Tatahuicapan
Juanita, promotor for Culturas Populares, Tatahuicapan

Wednesday, November 12: Soteapan and San Fernando
Mere Mateo and her husband, Arnulfo, *promotora* with PSSM, Soteapan
Santos Franco, *promotor* for PSSM, Soteapan
Solfisia and family, involved in *solar* program and women's committee, San Fernando
Raymundo Márquez, president of the Popoluca Society of Palm Producers, San Fernando
Melquiadez Cruz Rodriguez, *promotor* for PSSM, San Fernando
Emilia, president of women's group, San Fernando

Thursday, November 13: Soteapan and Ocotal Chico
Minerva Cruz Cervantes, *promotora* for PSSM, Soteapan
Apalonia and family, *solares* program, Ocotal Chico
Maria, *solares* program, Ocotal Chico
Frumencio Gomzales, health promotor, Ocotal Chico
Pedro and his son, reforestation and seed selection programs, Ocotal Chico

Friday, November 14: Pajapan and Catemaco
Angelica Aguilar, biologist with Culturas Populares, Pajapan (Andres)
Corazon Aceibo, SEDAP, Catamaco
Lorenzo Arteaga, head of *promotores* network, Catamaco

Saturday, November 15: Catemaco and Xalapa (Andres returns to Canada)
Alfonzo Olamendi, SEMARNAP, Catamaco

Luisa Paré, former project leader PSSM, Xalapa

Sunday, November 16: Xalapa
Rafael Gutiérrez, current project coordinator, PSSM
Lourdes Gódinez Guevara, head of women's projects, PSSM

Monday, November 17: Xalapa
Hector Hernandez, biologist with SEDAP
Jésus Dorantes, director of Forestry, SEDAP
Antonio Gonzales, director of the Lox Tuxtlas reserve, SEMARNAP

Tuesday, November 18: Xalapa
Francisco Fonseca, Centro de Estudios sobre el Municipio
Javier Laborde, biologist, Instituto de Ecología

Wednesday, November 19: Xalapa
Enrique Portilla, biologist, Universidad Veracruzana

**** plus other people met along the way in the Sierra de Santa Marta ****

November - December
write up final report

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Appendix A2. Main Outcomes and Impacts in the Eyes of the PSSM Project Team

The following is a summary of a group interview with the PSSM researchers in Xalapa, carried out over one and a half days (7&8-11-97). The meeting was attended by: Lorenzo Arteaga, Rafael Gutiérrez, Fernando Ramírez, Luisa Paré, Emilia Velázquez, Noé Villegas, and the IDRC consultants: Andrés Sánchez and Tricia Wind.

Approach.

The interview was open-ended, with the active participation of all people present. A series of tables were created jointly by the group, guided by a small set of specific questions, clustering individual answers into categories which were in themselves defined through the clustering process. The following questions guided the discussion:

- What were the broad themes or areas of activity in which the team worked over those four years? This lead to the creation of a table on areas of activity (programs) and outputs.

- What would had happened if the research projects never occurred?
- What has been accomplished through the research projects?
- What could not be accomplished?

A number of themes were also brought up by the participants during the discussion. Many of these were followed in more detail and are summarized in the following sections.

Initial observations by the group.

- Several of the participants were concerned about the broad scope of our impact study and the very limited time we would spend in the Sierra, which meant that it would be very hard to carry out meaningful measurements to substantiate any claims of impact.

- A couple of people suggested that we conduct the study in the Sierra with a minimum of participation from the research group to ensure objectivity in our findings. We followed this advice for the most part of our field visits.

- There were also doubts about being able to differentiate between impacts that resulted from the research projects and some that did not. "Continuity" came as a recurrent theme. They consider their work as the continuation of the "initial thrust"of the research projects. They have kept working in most of the same programs initiated during the research projects, even though there are differences in approaches, personnel and new groups of people that they work with in the Sierra.

- The research projects facilitated a process of capacity strengthening within the project team, as well as in the Sierra. The process of capacity building in the Sierra is slower but is on-going. *Campesinos/as* are learning from *campesinos/as*.

Factors that influenced the work of the PSSM in the Sierra.

Their initial research had an academic slant, but this changed soon after they began to work in the Sierra. The following factors had a mayor influence in making their work action-oriented and responsive to local needs:

- **Forest fires**: 1991 was a particular bad year for wildfires in the Sierra, involving thousands of hectares of pasture and agricultural lands, as well as forest. This made necessary the implementation of a fire prevention campaign, including the production of local information pamphlets and videos. The campaign was intensively carried out between April and July 1992, visiting 16 communities throughout the Sierra.

- **Eucalyptus plantations**: The Simpson Paper Company (with the help of SEDAP) wanted to establish a plantation in the area of Pajapan, waving as a carrot an investment of US$13 Million. The team carried out an environmental and social impact assessment of the project and presented it to local communities that were going to be affected. The communities used this information in making their decision to reject the eucalyptus project. This rejection, in turn, increased the pressure on the research team to come up with, and begin implementing alternative development strategies. This felt pressure is captured in the words of a researcher: "We came to convince them that it was a bad deal for them, but then they asked us: What [alternatives] do you propose instead? What do we do?". This delayed their diagnostic work as they felt compelled to give more emphasis to activities on the ground.

- **Local experimentation**: As he joined CIMMYT, Daniel Buckles began to have a strong presence and influence on the team, with his determination on recovering and using traditional knowledge and experimentation by *campesinos* as the basis for developing new alternatives/ technologies suitable for the Sierra.

- **Training in participatory methodologies**: Then came Anthony Stokes (Forest Island Project, California) who worked briefly as a consultant for the team, exposing them to participatory tools that would help the team and communities generate local assessments and develop proposals jointly.

- **Balancing scientific rigor & action**: Jacques Chevalier and Daniel Buckles brought formality and scientific rigor into the team's approaches, while Luisa Paré was the driving force ("the engine") behind the implementation of local actions.

- **Development through knowledge**: The flexibility of the Canadian funding and its emphasis on capacity building allowed the strengthening of the PSSM as an institution, as well as the many

training activities of groups and individuals in the Sierra.

Research products.

The first "clustering exercise" resulted in the following list which summarizes their main areas of work, and a corresponding table (Table A2.1) outlining specific research products or outputs.

Main areas of work:

- Basic research
- Institutional strengthening and consolidation
- Local training and promotion
- Experimental research
- Impact on policy makers & regional development
- Facilitating academic studies
- Product development
- Information dissemination

What if the research projects never happened?

The team concluded that their work has had an impact in the Sierra. The possible scenario without their presence included:

- more intense wildfires
- eucalyptus plantations in the area
- abandonment of *parcelas*
- no women's organizations in the Sierra
- no priority zone at the federal level (los Tuxtlas)
- ecological importance of region less known (the Sierra "is now on the map")
- greater deforestation

What was achieved & what was not.

A lengthy discussion surrounded the question: What has been accomplished through the research projects? The team's answers were usually accompanied by specific examples when defining specific achievements. These can be considered also as first indicators of the different impacts. The salient points are summarized below in no specific order of importance.

- ***An in-depth knowledge of the region***. This lead to funding by GEF (World Bank) which in turn gave the team a model that interested SERMANAP (Federal Ministry of the Environment) with subsequent funding.

- ***Development & promotion of sustainable productive alternatives***. This lead to the *campesino*-to-*campesino* dissemination to different groups and individuals within and outside the Sierra.

- ***Development & promotion of integrated models of agroferstry & agricultural production.*** Provided alternatives to state and federal programs.

- ***Network of promotores campesinos***. It allowed the multiplication of project impacts in the Sierra and other States.

- ***Cancelation of the eucalyptus project***. Forced the team to promote other alternatives to development.

- ***Establishing the PSSM as a non-governmental registered insititution***. They remain active today.

- ***Establishing the Sierra Santa Marta as a priority area***. This lead SERMANAP to include the Sierra de los Tuxtla into the PRODERS.

- ***Establishing the PSSM as an actor*** in the development of the Sierra at the state and federal levels, as well as in academic circles.

- ***Development of local capacity on experimental research***. *Red de promotores* continues with local experimentation.

- ***Facilitation of organization processes for women.*** There are more groups today, doing more activities.

- ***Heighten awareness on environmental degradation processes among some people in the Sierra.*** There is less burning, less wildfires, less poisoning of rivers. A number of community groups have also been established for the protection and use of natural resources.

- ***Establishing a new mind-set in many local people on the worth of the forest and its possible cultivation.*** Many people are making a shift from a "gathering culture" to a "cultivation culture" vis a vis the forest, assuming responsibility for the sustainable management of natural resources. Examples include groups of *palmeros*, the ecology committee protecting oyster banks in La Laguna del Ostión, fire prevention measures (often institutionalized at the *ejido* level), reforestation and deer management, etc...)

In terms of what was not achieved, the following issues were raised:

Lobbying: Their efforts have been recognized as valuable by some government officials, but they have also created opposition from others. Empowering local people and groups means erosion of established interests. For example, their work to stop the eucalyptus project resulted in a distancing

by the state ministry SEDAP.

Coordination with on-going government programs: This has been attempted with mixed success. It has resulted in several bad experiences, as often government officials make promises that they don't or can't keep, compromising the credibility and trust of the PSSM and *promotores* with the people. There are also structural problems within institutions that prevent government programs to be adapted to local conditions.

Municipal planning: This has been the weakest side of their work. Independently from the corruption and political antagonisms found in some municipal governments, some members of the team believe that their lack of knowledge and experience in this field limited their chances to have an impact at this level. There was no consistent internal strategy developed to work with municipalities. There were some attempts, but these lacked more thorough planning and follow-up.

Impact on policy makers: This has been limited. Different reasons include: "institutional schizophrenia" of some government bodies, opposite development philosophies, and ulterior interests of different individuals in positions of power.

Limited reach: The team was unable to work at the family level and introduce a more integral view of development. The promotion of this integral vision largely remained within the network of *promotores.*

Lack of consistency: Some activities or programs carried out by the PSSM were more successful than others. One reason for the lack of success of some activities has to do with the local people involved, their receptivity and support for the particular activity. Local politics play an important role in this. In some instances, particular individuals in the Sierra have actively discouraged other people to participate. In a later discussion, one team member observed that their more successful programs have generally involved: better planning (a well thought out strategy and stronger basic research), a clear delineation of responsibilities, adequate resources, and adequate and persistent follow-up (when problems arise, there has been the will and effort to put things back on track). Activities that have not been so successful have tended to lack several of these elements.

Summary of Outcomes & Impacts

The main outcomes of the research projects were clustered along the following categories:

- Productive alternatives
  - Technology package
  - Alternative models (consciousness level)
- Human organization around conservation & production
  - network of *promotores/as*
  - women's groups
  - ecology committees

- Building knowledge and capacity
- Municipal planning
- Lobbying - becoming Interlocutors
- Institution strengthening

Table A2.1 Research products or outputs.

Basic Research	Institutional Strengthening and Consolidation	Local Training and Promotion	Experimental Research	Impacting Policy Makers & Regional Development	Facilitating Academic Studies	Product Development	Information Dissemination
Diagnostics, strategies, GIS, and databases created	finances	Fire Prevention campaign - workshops, pamphlests, videos, posters	Local competition on alternative green manure plants	EIA on eucalyptus plantation leads to rejection of project	Field research for undergraduate and graduate theses - national & international	Rainforest Herb. Tea	Over 16 papers published in national scientific journals
Economic and Ecological Zonification	basic material infrastructure	Creation of *Red de Promotores*	Creation of local *Palama Camedor* nurseries	Reforestation & agroforesty programs replace eucalyptus option	(over 12 theses)	Organic Vanilla	16 other papers presented in national and international fora
Maps of lifezones	money and other projects from other agencies	Green Manures - training over 2,000 *campesinos* in 43 communities	Local Experimentation with organic horticulture in *solares*	Fire Pevention Campaign - government staff seconded to campaign	Supervision of national students carrying out their social service in the area	*Palma Camedor*	Over 15 technical reports on the various programs implemented

Basic Research	Institutional Strengthening and Consolidation	Local Training and Promotion	Experimental Research	Impacting Policy Makers & Regional Development	Facilitating Academic Studies	Product Development	Information Dissemination
publications: 1997 book with SEMARNAP	documentary products (bibliographies, photos, videos)	Coffee growers workshops	Local experimentation - green manures	Sierra Santa Marta recognized as priority area	Luisa Paré's doctorate from Carleton U.	*Picapica*	6 videos, 2 posters
Final report, 1992	known at local and state level	Creation of 3 groups of *Palmeros*	Identification and promotion of local maize varieties	Regional planning leading to GEF & PRODERS		Conservation of oyster beds	14 promotion booklets on alternative technologies
book: plan for the integrated development of Los Tuxtlas	collaborate with Culturas Populares, CIMMYT etc.	Training *campesinos* on local experimentation with new productive alternatives	Local experimentation with local and improved maize varieties	Inter-institutional collaboration on regional development (academic, NGOs, gvt. org.)		diversification of staple foods	
study of regional physical environment	course on ecology and lifezones in Costa Rica	Creation of 3 ecology committees in the Lagoon Zone	Local experimentation - contour sowing	Cooperation on conservation prog. with SEDAP			
study of traditional knowledge	part of network on natural resource management	Community Workshops to present & discuss EIA on eucalyptus plantations	Local experimentation on hedgerows				

Basic Research	Institutional Strengthening and Consolidation	Local Training and Promotion	Experimental Research	Impacting Policy Makers & Regional Development	Facilitating Academic Studies	Product Development	Information Dissemination
made the region more well-known	basic equipment: vehicle, computers etc.	Development of integrated sustainable technology packages	Local experimentation on vanilla				
better knowledge of the regional situation and dynamics	experience in integrated research, experimentation and diffusion	Creation of 3 women's groups for production activities in house yards					
Porposal for the zonification of nucleus zones for the reserve	broad information on eucaluptis	Nutrition workshops in two communities					
evidence of environmental impact of opening Laguna de Ostión	proposal for Phase III served as basis for present proposal to NOVIB	Training and demonstration workshops on seed selection					

Appendix A3. The *Promotores'* Point of View

The following is a summary of a group interview with the *Red de Promotores*. The meeting was held in the village of El Pescador in the Sierra Santa Marta on 09-11-97. It was attended by the *promotores/as* (see below); some PSSM staff: Lorenzo Arteaga, Rafael Gutiérrez, Noé Villegas, Sergio Martines, and Valente Herrera; and the IDRC consultants: Andrés Sánchez and Tricia Wind.

Approach.

The meeting consisted in an open dialogue surrounding four questions. After an initial introductory exercise between the consultants and the team, people were asked to think about:

- two things or reasons that made them want to join the network of *promotores*
- two personal benefits that they derived from being part of the network
- two achievements in their own communities that have resulted form their work with the PSSM
- two things that remain to be done

Each of these four themes were pursued in sequential order, giving about 20-30 minutes to each. For each theme, the *promotores* volunteered their answers at random. This in turn, generated opinions from others and clarifications. Care was taken to facilitate the contribution of every *promotor/a* to the discussion, on every theme. The dialogue was very fluid. Members from the PSSM remained largely as observers, except for Rafael who kindly summarized the different ideas been presented on large sheets of paper.

The discussion was very rich in personal emotions, anecdotes and perspectives particular to the different communities where the *promotores* come from. For this reason, rather than providing an impersonal summary of the issues raised, an attempt is made here to reproduce as much as possible the individual contributions to the discussion. The reader should keep in mind that the following summary is reproduced from field notes (no tape recording of the meeting was done) and is being translated from Spanish into English. We have tried to respect and convey as accurately as possible the images used by the speakers, albeit with the limitations mentioned.

The following *promotores* were present in the discussion:

Doroteo Chima, from Santa Rosa de Hueyapan .
He is involved in soil conservation work, green manures, seed selection.

Gabriel Angel Cruz, from Pajapan.
He works 40% of the time as *promotor* and other 60% as *comisariado ejidal*; involved in reforestation, green manures, soil conservation.

Arón Landa Soto, from El Pescador.
He works in soil conservation, seed selection, green manures, experimentation.

Soli Cruz Martines, from Pajapan.
He works with green manures, seed selection, vanilla, palms, ixtle.
Victor Chapol Xoca, from Venustiano Carranza.
He works with ixtle, maize cultivation.
Manuel Mateo, from Catemaco.
He works on soil conservation, conservation of natural resources, palms, coffee production, and health (nutrition).
Lucio Lopez Cruz, from San Fernando.
He was attending in place of Melquiades who works on green manures, seed selection, "barreras vivas", coffee, palms, vanilla, pig rearing, and pest control.
Santo Campos Duarte, from Soteapan.
He is involved in agroforestry, coffee, palms, soil conservation, bee cultivation with Melquiades.
Mere Mateo Gonsalez, from Soteapan.
She is involved with organic horticulture, forests, *milpa*, green manures, experiments with hogs, dry latrines, stove "Lorena", and Popoluca traditions.
Minerva Cruz Cervantes, from Soteapan.
She is involved in promoting organic horticulture in *solares*, and supporting women's groups.
Chano, from Amamaloya
He joined the group in January. He is involved in health, green manures, soil conservation, dry latrines, consciousness raising.

- **Two reasons for joining the network of *promotores***

Arón: Through the PSSM, he became aware of environmental problems and the need for reforestation. Before, he did not pay much attention to these issues. The talks he attended made him aware of many other problems in the "*campo*" (rural areas), like erosion. He got interested in attempting to resolve the erosion problem. "Before we saw it as a natural thing, with no idea that we had to give, to conserve the earth."

Gabriel: Why become a promotor? It was the fire control [campaign] and reforestation, an initiative, a drive to enrich the area. "Pajapan was feeling the pressure with the eucalyptus project. After rejecting it, we had to work twice as hard."

Manuel: It was a similar experience to that of Arón. He attended a first talk with people of the project [PSSM]. In that workshop he became aware of erosion, of clear cutting. "Before I didn't know, as if in darkness. From that workshop, there came the idea to learn and prepare oneself more, to discover."

Doroteo: He wanted to know about cultivation techniques and was attracted by what the project was teaching, soil erosion. It was an awakening to see the problem, and attractive to be able to do something about it, to put things into practice.

Santo: He wanted to know about life itself, the life of the earth. He wanted to learn more about the positive things within nature and how they work.

Chano: The great problem for him is malnutrition. "In the land of Soteapan there are many things that need solutions. We need to have available resources - land and mountain [forest], with these we can consume local foods that are nutritious". This is why he became interested. He has been a health worker for 12 years in his community and sees the work of the project as a means to address malnutrition. "The problem of malnutrition is very grave. No solution has been found. The problem is politics. People want to depend on the *despensas* [basic food baskets distributed by the government twice a year to women with children]. I say no! Another way is necessary. The *promotor campesino* must promote self-sufficiency rather than dependence".

Minerva: She agrees. Women have the capacity to produce. They don't need to depend from "the paternalism that gives everything or from the husband to bring it home. Women can do it. They can produce healthy foods for the children".[1]

Mere: Why she became a *promotor*: She worked on the fields. Her *parcela* was full of stones, poor soil. They used to spend a lot of money on fertilizer. One year they did not have money to buy it, the land gave no maize. The project [PSSM] had given her husband some *picapica* seeds and he stored them away. But she saw the need. She sowed the seeds. Lorenzo helped her convince her husband to try the *picapica*. Now she and her husband have fixed the soil, they don't burn anymore, they don't use fertilizers.

Another reason is to be able to share with other *campesinos*. She has a "demonstrative *parcela*". Last month they were visited. People came from Ocotal Chico, Ocozotepec, San Fernando, el Mangal. They came to see all they have done [use of *picapica* to rebuild the soil, contour agriculture, different maize varieties intercropped with different fruits and vegetables]. "The friend of the Homshuk[2] - they

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[1] Note: Popoluca women have always worked the land with their husbands. Before agrochemicals and maize monoculture were introduced in the area, women were responsible for maintaining food diversity in the *milpa*. They also gathered a number of natural edible products from the nearby forests. Both sources of food diversity have dwindle. Minerva's comments address this distancing from food production that women have experienced and which has been largely beyond their control. This loss has also created more dependence on food donations from government, or on their husbands to make up deficits in subsistence production through income generating activities. One compounding problem is that the easiest form of credit a man can get in the Sierra is for alcoholic beverages in village stores, and often any cash available is either "boozed away" by the husbands or used to pay back drinking debts.

[2] Homshuk is the old Popoluca "Corn Child God". Many rituals were practiced not long ago to ensure a good corn crop. Every corn plant was treated as a child in need of care as it went through its life cycle maturing, drying and becoming food for the *campesino* in order to be planted and reproduce again. Both, *campesino* and corn plant

don't have it anymore. The little plants can be rescued, the friend of Homshuk can talk about this with *campesinos*. By observing [looking at what can be achieved], people begin not to burn, they leave it [the soil] covered with *basura* [plant material]", it is then possible to convince people to use *picapica* .

Lucio: "The soil was very hard - red earth." He was interested in learning new ways. He has a piece of land which he borrows. This is where he grows his corn. He has been using it for 8 years now [without letting it rest], and it is producing. "It keeps producing!"

Soli: He wanted to learn more about what the group had achieved. He wanted to work with green manures, work with other *campesinos* and learn more about the problems and needs of the countryside. His first need was for more corn, now his attention is turning to food diversity. "The milpa gave you before maize, beans, squash, wild tomatoes. Now it can not produce them. What is the problem? Where does it come from?". One of his interests is to learn more about this.

Lucio: "Lorenzo came to talk about *picapica*, about soil conservation, about feeding mother earth, give it food, to solve malnutrition." Melquiades began to put these things into practice in his field. He used less fertilizer, more *picapica*, got better crops. "It solved the malnutrition of the soil. Now there is a good production of maize. It is a good demonstration plot. Before it was affected by erosion."

Soli: Why a *promotor*? He wanted to guide his community away from the use of chemicals and cultivate the land with *picapica*. "Today we think that using *picapica* helps the nutrition of the corn. It receives, obtains nitrogen - a natural fertilizer. Before *campesinos* had everything: maize, beans, *chayote*, squash ...". He is interested to recover what was there before and was lost. Through the group he is learning to be able to bring back the diversity from before.

Question to the group: Why was it lost?

Arón: "It was lost when the technicians arrived to kill with chemical products. For example *quelite* [was lost]. From there came the malnutrition of families, the impoverishment of the *milpa* ... *Campesinos* became too trustful because chemicals are faster to clean with [weed out the *milpa*]. Before, one would take 15 days to do it, but with chemicals, in two days it's done. The Green Revolution - the agro-technical packages - I say it's like drugs: you give it away [very cheap] until you create dependence, and then they raise it! [the cost] From $10 it goes up to $70-80. It did not solve the problem! It became more acute! Natural seeds disappear, and then you need to buy seeds, you need to buy chemicals and it [the milpa] does not produce!"

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depended on each other for survival.

Lorenzo: "I want to clarify something, fight malnutrition yes! But also fight poverty of ideas and ideologies".

Arón: "One of the main reasons for being a *promotor* is that we learned to think. Before we used to think like the other one wanted us to. But this other was only thinking about his pocket, with no interest in the countryside. We awoke! And it not only helps in terms of money, but also in terms of time!".

- **Two personal benefits that they derived from being part of the network**

Doroteo: He receives training in every type of activity, as well as in how to train others. Before joining the project, he was shy, he would not go out much. Now he is out of that shell. "Nobody from my community used to look at me before".

Gabriel: Being part of the network has helped him to acquire knowledge and develop himself. He has also benefited form being able to make contacts with other organizations.

Lucio: Being able to receive from other *campesinos* different exchanges of ideas, new ideas about working with others. Also, the new cultivation products and techniques, and different types of seeds.

Minerva: Being able to break with routine (domestic work); to conquer a space as a free women, independent; the knowledge and ability to give workshops on her own initiative.

Arón: He learned how to reduce costs of production; "To sow less, and harvest more; to go less in debt, and sell more". Before, he would sow 3 to 4 has. and had to buy corn. Now, he plants 1 to 2 has. and can sell corn. In other words: "produce better without bothering nature too much".

Chano: He has been able to achieve a more rounded [complete] nutrition for him and his yard animals, poultry and pigs. Also being able to invite his community to follow his lead in having a more rounded [diversified] production.

Manuel: He learned how to improve production in his field, how to do things better. "You cannot depend on the government. They do not give proper advice. In my community agricultural engineers never come to train people how to improve production yields".

Santo: "I learned how to relate to the forest, not to cut trees, not to destroy. It also gave me more experience, more knowledge that has helped in my studies. I also learned about botany, medicinal plants, plant families and *sangregado* [*Croton draco*]".

Mere: She used to look at men working their fields [struggling with production]. She began to apply what she was learning, and she found she could do it. "I am feeling free. I direct my husband: you will do this, we are going to put it into practice, to demonstrate [to others]. Both, him and I we put it into practice. Another [benefit] is that I can now talk to my companions, the women, talk with children and husbands to make women free. One *compañera* liked my talk very much. To help each other, as a couple [husband and wife]. You need the support of everybody [the whole family] to support [the participation of women in decision making]".

Minerva: "I want to clarify that by saying "direct her husband" Mere doesn't mean to control him." It was very hard to teach her husband to trust Mere and adopt new ways of doing things. Now they work as a couple.

Victor: He learned a lot about the cultivation of corn. "I don't spend a lot of money on chemicals and I am now learning how to manage natural resources and profit from them, like *ixtle*".

Soli: "I have received benefits in the field, the *milpa*. I don't buy fertilizer and the filed produces more. We don't have to go running any more to buy agrochemicals. The benefits? We found the solution ourselves. We now look how to go about solving problems in our fields."

- **Two achievements in their own communities**

Arón: "It was a giant step. It made us aware of the need to control fires, so they don't run wild. Nature began to recreate itself. Well, if we are going to control fire, we can also conserve other resources, deer, crawfish." This also led to reforestation, 200,000 trees have been planted. There are two related things: (i) getting involved in the conservation of natural resources and reforestation; and (ii) being able to protect the work accomplished from problems with neighbouring communities (poisoning of streams and deer hunting)[3]. "These are achievements that we have. More importantly, other communities are now beginning to take care of the deer, like a seedling that is begining to grow. It is a massive achievement for the community." Poisoning or use of explosives to kill fish has also stopped.

Doroteo: "Almost the same [points], not burning the mountain ...before, coffee plantations would also catch fire. Medicinal plants had disappeared. From that time, people

[3] Arón is referring to conflicts they experienced in the past with members of other communities which either overhunted deer or poisoned watercourses with slug doses of pesticides or fertilizers in order to kill fish to collect and sell in the Sierra for human consumption. This latter problem (using chemicals to produce fish kills) has been reported in several parts of the Sierra.

began to try and prevent wildfires. Now people practice "half burns" or they burn their whole fields but they let others in surrounding *parcelas* know and take precautions. Fire doesn't run free any more. Wildfires were stopped and reforestation came in ... medicinal plants started to come back. This was an important achievement in terms of health."

Gabriel: Control of fires was also the most important achievement for him. "Before there were many fires, it was a belt around San Martin. Now that it is forbiden [to burn without precautions] there are less fires. Another: people could detect benefits from the *acahuales* and began to conserve them in order to be able to build their houses, and in the Sierra itself [the forest area] now you cannot cut [wood]."

Chano: He thought that demonstrating the way a couple can work in [the municipality of] Soteapan was important[4]. "It is a way to unify work between men and women ... to create a consciousness in women and men ... the woman raises the consciousness on the husband so he stops burning, using fertilizer and begins to conserve the soil. It is a work method that is complete - where all the family participates, including the women and animals. Women begin to obtain a right and also begin to work toward conservation [of Nature] and unity [of the couple] from within her house, outwards. Another achievement is .. no contamination ... introduce in schools - to the future [young generations] so they don't come with that problem. By installing sanitary latrines in schools you are giving knowledge to that future Mexico."

Arón: "To complete, in the zone of Soteapan, women have no voice nor vote. It is an achievement for the people with which [the project] has worked. A woman has to go to clean the fields, to harvest, but did not have a voice to change the ways of production. The situation of the women in Soteapan is very grave. I think it is very important that the couple is the one that takes decisions. This is a *chulada* (a beautiful thing)."

Victor: Achievements in the community include using less fertilizer and pesticides, and the 160 ha of communal [Forest] reserve, but then came Procede [government program for privatization of the *ejidos*] and that reserve was divided among 20 people who wanted to fell [cut the trees] in order to make *milpa* [corn field*s*]. The project wanted to use it to grow *ixtle* among other things. It strikes him [that these 20 people were just thinking of corn production] .. they can get from it wood, palms, animals, and water ... so the water sources do not run dry. "More information is lacking for all the

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[4] Chano is referring to the relationship between Mere and her husband and how they both work side by side in the *milpa*, and the importance of this example to others. It is a working model which Mere and Minerva told us in a later interview, both are actively promoting in their work with *solares*. They want to give emphasis to the needed for cooperation and mutual respect between all members of the family and the recognition of the contributions of women to support the household.

communities toward the coast, [they need to learn that] it is possible to have natural products. More advise to these communities is needed."

Mere: Another achievement is the work on *paji* (diarrhea). People are now accepting that it is important to pen pigs ... to understand where diseases come from.

Santos: Mere's achievement is important. She worked hard to convince her husband, first by inviting him to workshops on control burning, then *pica pica*, hedgerows. Now my uncle does what you tell him. It was hard for him to understand at first. But it has been now 3 years since he does not burn [the *milpa*] and has better yields.

Minerva: She considers that it is important for them as *promotores* to insist in carrying out practical demonstrations and not limit themselves just to talk and give out pamphlets. They had to do actual [hands-on] work with the people to demonstrate things so as to get them interested, showing that things do work by doing them.

Lorenzo: He believes that more people in the Sierra are now self-sufficient in maize. This was something rarely found before, but now there are some, and the trend to have sufficient production for self-consumption is increasing.

Arón: "[The project] also awakened [our] curiosity ... about tomatoes, chile, we now look for other things. As *promotores*, we have resolved the problem with maize. We now have this under control. We have now more time. Before [we had] neither time nor money to be looking for other things. But now we do not want to live only from maize. It never worked before. We were hanging from corn [had a rope around the neck]". The *promotores* are now aware of the necessity to diversify their production and now have more time to do it.

- **Two things that remain to be done**

Manuel: "A lot remains to be done. In my community we got land through a presidential resolution, 2200 ha." But of these, only 300 ha are suitable for agriculture. These 300 ha were divided among 80 families, giving only 4 ha each. The rest of the land could not be parcelled out because it is *serrania* (very steep slopes - not apt for agriculture). "We need more knowledge on how to profit from these resources [forested steep slopes] ... How to manage it, how to use the resources without destroying it. We would like a management plan for that area of 2,000 ha to see how to manage it. There are many needs in my community. Those 4 ha are not enough to sustain a family."

Gabriel: There are different problems, depending where you live. In Pajapan, the problem remains on how to control the extension of cattle ranching. They had workshops on

intensive cattle raising and they need to work harder on this management option to control the land expansion of this industry. They have not yet solved either all the problems they have encountered. For example, they have not found a solution to pest control, not only in the *milpa* but also with other natural products. He thought that much remained to be done on pest control.

Arón: "The problems in the *campo* [rural area] are enormous. Something missing is the need to refine [our] work plan and the methods themselves. Find methods of adoption [dissemination] of the technologies we are applying. It is very striking that my neighbour, seeing that I use green manures - him, just next to me - burns [the *milpa*]. He sees that I produce more than him, but keeps doing the same thing. The level of education is very low."

"Then there is also a difference in ideological system. Others [government agricultural technicians] want us to think the way they want us to. It is hard, the problem of education of the peasant. The technician says another thing[5] . It is hard. I ask my self: until when are we going to find a method of adoption that is general?".

He remarks that when he first learned about the various techniques brought in by the project, he was delighted. He thought that in 3 years everyone in the Sierra would be using them. But this has not been the case.

"Another need is to find green manures that are suitable for the two growing seasons." More research and experimentation [by them] is needed on this.

Victor: He agrees that more research is needed on green manures suitable for both seasons. "Wildfires are now controlled. Reforestation is on-going. But missing .. some people cut wood and destroy the reserve zone." He has seen how several people come down with a lot of cut wood [clandestine logging]. "Illegal cutting has not been resolved."

Arón: "More training is missing. More spread, for those people .. for more human resources. We are few [people] for the large area. [We need to] make seed beds of restless people that want to work on these issues."

Mere: "A big problem is this question of pests. Her husband has found a secret to sow." She explains that one needs to work the land with "heart", carefully and patiently looking for a solution. She gave an example on how her husband spent time identifying what was the pest ruining their beans and how it worked. He then tried different ways of trying to control it until he found the answer.

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[5] Arón is referring to the fact that government extension workers come and contradict what they, the *promotores*, are saying or doing and they can not argue back because the extension workers often looked down on them.

Chano: He feels that they need to get better organized. "We often have a heavy work load ... a lot of workshops . . health, pests, others. But because of having a lot of work, sometimes we do not put it [things they learn] into practice, and if we do not do it, we cannot convince [others]. We need to get better organized sometimes. More responsibility from the *promotores* is missing."

Mateo: "To complete [complement previous ideas]. Yes, need to follow method against pests. Because of lack of time, it has not been done in our free time. Before doing anything with people, we need to do it ourselves first. For example, [the use of] lime. Because of lack of time I was not able, but besides me, I lent it [to his neighbour]. He did do it and he learned. I made the effort. We all need to work the same."

Lucio: There are communities without *promotores*. He told three friends about these experiences. They found them important, but because there are no *promotores* in that community they asked him: "Why don't they come here". There are many fields that can be worked [with these alternatives] but people do not have help to be trained. "In San Fernando, people need to understand very well about the use of the dry latrine. But they have the doubt if it stinks[6] ... or with the sowing of *picapica*, they think that the work is very hard. To convince people from one day to the next is very hard [specially] with a lack of guidance.

Finally, at the end of the discussion of these questions, we asked the *promotores* if they thought the project had **other impacts outside of the Sierra de Santa Marta region**.

Gabriel: He believes they have. "Nobody is a prophet in their land .. about training .. what is learned." He has had contact with other organizations. He has been to Jáltipan. "Two organizations of peasant groups invited me. I went there to give a workshop on green manures. There were close to 60 peasants. But I went unarmed. We went to visit some fields. They were asking for seeds, but I did not have any with me. So we could not have a commitment." He has also gone to other places, Mecachapa by Totonacapa, and Texistepec. "[I went to see] other friends for talks on palms and vanilla but we have not deepen any achievements there. We were not able to promote them."

Manuel: "We have had impact. We were invited with Doroteo to talk about green manures and soil conservation by GRECCA [an NGO] to Izhuatlán del Café.

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[6] A common belief among the Popoluca is that some diseases can be spread through the "smell" or odour of things.

Arón: "Let me generalize. [The request for] a training centre is precisely for this[7]. For [to meet] the demand from other organizations that are beginning. We have trained in Chiapas, Oaxaca, Tlaxcala, Campeche and here in Veracruz. Demands are increasing ... to go to workshops, exchange experiences, about *ixtle*, forest resources, organic coffee, soil conservation. Workshops that you offer and that you need, begin this exchange [of knowledge]".

Lucio: "We were with José Luis in Jojutla. We were invited to share our experience on seed selection of native maize [varieties]. The improved varieties rot. The native [ones] are better adapted for not been knocked down by the wind." They talked about how to select the seeds in the field. "The *campesinos* were convinced in that region. They did not have the same varieties from here." Both exchanged seeds and tried them in their own lands.

Arón: "Another impact, not well applied ... in the government .. because of the work of the PSSM, the government began [to work] on these things. Badly done, but they are talking. From the dumbest to the most corrupt, they use the *rollo* [rhetoric]. They talk about ecology and the protection of the environment. Our relations with them were a setback. But we will take them up once again, with more caution: First you give it to me, and then I will promote it.[8]"

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[7] The network of *promotores* had just made a proposal to PSSM for funds to build a centre for capacity building in which they could meet, have demonstration plots, have workshops, keep documents related to their experiments and experiences, and host delegations of people from other regions who want to come and see their work in the Sierra.

[8] Arón is referring to problems they have experienced in trying to work with government agencies. In more than one occasion, the government has promised supporting programs with the *promotores* help but have failed to keep its word, delaying/reducing payments, materials and/or cash incentives to peasants, and eroding the credibility of the PSSM and the *promotores* in the process.

Appendix A4
Table of Inputs, Activities, Impacts and Reach of PSSM

Inputs	Activities	Outcomes Outputs	Impact	Reach
IDRC inputs: financial: Phase I: $277,377 (65% of budget) Phase II: $393,790 (45% of budget) proposal design trips:David Brooks, 12/89; Joachim Voss 05/91 & 11/92 Ronnie Vernooy 04/93 library materials on eucalyptis conference facilitation (hillside, NR co-mngmt in NS) ***other funders Ph I:*** CIMMYT Forest Island Project, Calif Thiedes Foundation Calif	**Micro: pursuing conservation and sustainable development in the Sierra**			
	Soil conservation and improvement through green manures	identification of appropriate green manure to fix nitrogen in soil of corn plots (*picapica*)	improved soil fertility, decreased erosion, leading to higher corn yields. provided fodder for pigs	communities throughout the Sierra: El Pescador, Mangal, Soteapan, San Fernando, Ocotal Chico. Also spread to communities outside the Sierra and increased awareness among government officials
	diversification of crop production in both *milpa* and *solar*	identification of alternative varieties of corn that are well-suited to the area. identification and support for other food be cultivation	diversification leads to improved nutrition, more food self-sufficiency, decreased financial insecurity from relying on monocropping export commodity like coffee	communities throughout the Sierra. Although women's groups supported by the project are limited to Soteapan, there are efforts to diversify *solar* production also in El Pescador.
	Reforestation & prevention or control of forest fires	reforested areas campaign to control fires	increasing areas of reforested lands increased awareness of importance of controlling fires. fire-control committees and policies created in various communities.	community ecological committees, local ejido leaders, community leaders, other members of Sierra communities. SEDAP
	non-timber forest product cultivation: palms, coffee, vanilla, sangregado	products and techniques for cultivation. facilitated access to better markets	diversification of forest use. decreasing incentives to deforest	palms & coffee in higher areas of Soteapan, vanilla in Pajapan, sangregado limited to promotors

Inputs	Activities	Outputs	Impact	Reach
other funders, Ph II: Desarrollo y Paz, Canada Interamerican Foundation Rockefeller Foundation Programa de Acción Forestal INI Dutch Embassy Consejo Civil Mexicano para la Silvicultural Sustentable SEDESOL Shaman Pharmaceuticals National Autonomous University of Mexico SEDAP	**Meso/organizational: for project team and within communities of the Sierra**			
	helping community members organize for capacity-building and along producer lines	*red de promotores/as, comites de ecología,* women's groups in Popoluca area, palm producer groups	overcame some traditional divisions within communities; increased reach of the project; acted as mechanisms to facilitate more sustainable impacts; created policy (eg control of fires); increased self-confidence and knowledge of members; members of committees discuss issues of the Sierra in policy and indigenous women's fora. palm producers were able to work together to get access to better markets, share inputs and techniques	members of these committees, community members, local government
	gathering an interdisciplinary team of researchers	incorporation of the project as an *Asociación Civil*	able to relate with other AC's, as a cohesive group with strategy to other donors, academic institutions & government. enhanced sustainability of impacts	within the project team, and for people from other institutions, other donors, government departments and officials
	Macro: Policy impact with state and federal government			
	researching effects of eucalyptus plantation on the development of the region. community consultations on the subject	campaign against the plantation	averted plantation within the Sierra. made project team and *promotores* feel more responsible to develop alternative productive activities to make up for the loss of a multi-million dollar plantation	affected communities (Pajapan), U.S. eucalyptus business promoter, government (especially SEDAP), other NGOs, and other people reached by the project members' participation in conferences
	basic and participatory research and experimentation on productive alternatives (micro-level products)	feasible and sustainable alternative production strategies and products	opened spaces for government programs to operate, pick up ideas that they had made feasible	SEDAP, INI, SEMARNAP and other government ministries
	basic research and publicity on the Sierra de Santa Marta region	publications, conference presentations, contributions to official discussions on the area, etc	base line data "gave life" to the reserve decree; increased public and government awareness of the area; gave concrete suggestions for the management and sustainable development of the region	Mexican public, federal and state-level government officials, state president